

**STEEL TECHNOLOGY COMPETITIVENESS AND
ENERGY CONSERVATION ACT OF 1988**

HEARING
BEFORE THE
SUBCOMMITTEE ON ENERGY REGULATION
AND CONSERVATION
OF THE
COMMITTEE ON
ENERGY AND NATURAL RESOURCES
UNITED STATES SENATE
ONE HUNDREDTH CONGRESS
SECOND SESSION
ON
S. 2470
TO PROMOTE TECHNOLOGY COMPETITIVENESS AND ENERGY
CONSERVATION IN THE AMERICAN STEEL INDUSTRY

INDEPENDENCE, OH, JULY 1, 1988



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STEEL TECHNOLOGY COMPETITIVENESS AND ENERGY CONSERVATION ACT OF 1988

FRIDAY, JULY 1, 1988

U.S. SENATE,
SUBCOMMITTEE ON ENERGY REGULATION
AND CONSERVATION,
COMMITTEE ON ENERGY AND NATURAL RESOURCES,
Independence, OH.

The subcommittee met, pursuant to notice, at 1 p.m., at the LTV Technology Center, Independence, OH, Hon. Howard M. Metz-enbaum, presiding.

OPENING STATEMENT OF HON. HOWARD M. METZENBAUM, U.S. SENATOR FROM OHIO

Senator METZENBAUM. I want to apologize for being a little late, but I was with Governor Dukakis in Dayton and I've been doing my darndest to get John Glenn on the ticket as Vice President, but other than that, forgive me for being late.

Now, let me explain something further, because I am running late, I am going to ask our witnesses to be relatively brief. I may have to leave—I will have to leave at a certain time because I am scheduled to speak to the convention of the Veterans of Foreign Wars down at the Public Auditorium or someplace, the Convention Center. But if we do, one of my staff assistants who are with me will carry on for me. I consider this hearing a very important one and I consider the substance of it to be particularly significant.

Today the Subcommittee on Energy Regulation and Conservation meets, in conjunction with the Senate Steel Caucus, of which I am Chairman, to consider S. 2470, a bill I authored to promote technology competitiveness and energy efficiency in the American steel industry.

There was a time when the American steel industry led the world in productivity and technology development. But now our foreign competitors have taken the lead in developing state-of-the-art technologies. They had a lot of help in the form of subsidies from their governments, while our steel industry has been going it alone. We cannot play catch-up forever. The future of our steel industry depends on its ability to regain its place as second to none in technological innovation. My legislation is intended to make the federal government a partner in that effort.

In the 1980's the American steel industry suffered immense losses; laid off over half its workforce; and reduced capacity dra-

matically. At the same time, it invested \$4.3 billion in new equipment and vastly improved quality and productivity.

But that is still not enough. The future of many companies, and many more jobs, remains uncertain. We need to outcompete our foreign competition by continuing to increase productivity through technological modernization.

But the steel industry lacks the resources to make this investment alone.

In 1986 Congress recognized the industry's need and created a government-private sector partnership to develop new, energy efficient, steelmaking technologies. But that program will terminate at the close of this fiscal year. My legislation extends this partnership through 1993. And it would, for the first time, enable the industry to draw on the vast mind power of our universities and national labs for research and development initiatives. These are resources we cannot afford to ignore.

It takes a concerted effort to develop advanced technologies. And it takes cooperation to pool the resources of government, industry and universities to meet that challenge. But it is a challenge that we must meet if the United States is to have a strong steel industry. America cannot be a first-rate economic or military power without a first-rate steel industry. That is why I intend to push for passage of R&D legislation this year. I am optimistic we will be successful.

I look forward to hearing today's witnesses.

I want to say how grateful I am to LTV for the courtesy of opening their facility for the purpose of our conducting this hearing. I want to apologize to LTV for the fact that I had hoped to be able to see some of the things that they're doing here at this facility, but I want to say that since I am a Clevelander and since this facility is not that far from where I live, I am prepared, with their cooperation and hopefully at their invitation, to come back. I apologize for not having the time to do it today, but I think it more important that at this point we hear the witnesses. My failure to look at the facilities and what they're doing is not because I am not interested, it's just because of the pressure that I found myself in with time, and so I want you to understand.

I also want to say, convey my hello and how are you comments to Dave Hogue, with whom I have worked quite closely, as you know, on problems of health and life insurance for the retirees.

At this point, I will include in the record a statement of Congresswoman Mary Rose Oakar, who wanted to be here with us but could not.

[The prepared statement of Ms. Oakar and the text of S. 2470 follow:]

STATEMENT OF CONGRESSWOMAN MARY ROSE OAKAR

HEARING ON STEEL INITIATIVE

INDEPENDENCE, OHIO

JULY 1, 1988

SENATOR METZENBAUM, THANK YOU FOR INVITING ME TO PARTICIPATE AS A MEMBER OF THE COMMITTEE. I APPRECIATE THE OPPORTUNITY TO EXPRESS MY STRONG SUPPORT FOR THE AMERICAN STEEL INDUSTRY AND THE STEEL INITIATIVE PROGRAM.

THE STEEL INITIATIVE HAS PROVEN TO BE A SUCCESSFUL TOOL FOR REVITALIZING OUR STEEL INDUSTRY AND NEEDS TO BE EXTENDED. I APPLAUD YOUR EFFORTS IN INTRODUCING S.2470, WHICH WOULD IMPROVE AND EXTEND THE PROVISIONS THROUGH 1993. WE MUST CONTINUE TO SUPPORT PROGRAMS WHICH ENCOURAGE THE USE OF RESEARCH AND DEVELOPMENT FOR THE PRODUCTION OF ADVANCED TECHNOLOGY.

IT IS ESSENTIAL TO OUR TECHNOLOGY BASE THAT WE USE ALL THE RESOURCES AVAILABLE TO ENSURE THAT AMERICAN INDUSTRIES REMAIN INTERNATIONALLY COMPETITIVE. BY TEAMING THE DEPARTMENT OF ENERGY'S RESEARCH LABORATORIES WITH THOSE OF INDUSTRY AND ACADEMIA, THE DOMESTIC STEEL INDUSTRY CAN DEVELOP THE "CUTTING EDGE" TECHNOLOGY NECESSARY TO REEMERGE AS A WORLD LEADER.

AS WE ALL KNOW, STEEL IS AN ENERGY INTENSIVE BUSINESS. A SIGNIFICANT PERCENTAGE OF STEEL PRODUCTION COSTS ARE DIRECTLY ATTRIBUTABLE TO ENERGY COSTS. BY DEVELOPING THE MOST ENERGY EFFICIENT STEEL PRODUCTION METHODS, COSTS CAN BE BROUGHT INTO LINE WITH OUR FOREIGN COMPETITORS. FURTHERMORE, THE RESEARCH AND DEVELOPMENT GLEANED THROUGH THIS PROGRAM WILL HAVE VALUABLE SPIN-OFF POTENTIAL IN OTHER INDUSTRIES AS WELL.

IN FACT, THIS BILL WILL EVEN ALLOW THE UNITED STATES GOVERNMENT TO RECEIVE A RETURN ON ITS INVESTMENT AS ALL PATENT AND LICENSING RIGHTS WILL VEST WITH THE DEPARTMENT OF ENERGY. EVERYBODY WINS IN THE STEEL INITIATIVE--THE STEEL INDUSTRY, GOVERNMENT, TAXPAYERS AND THE NATION.

100TH CONGRESS
2D SESSION

S. 2470

To promote technology competitiveness and energy conservation in the American steel industry.

IN THE SENATE OF THE UNITED STATES

JUNE 6 (legislative day, MAY 18), 1988

Mr. METZENBAUM (for himself and Mr. HEINZ) introduced the following bill; which was read twice and referred to the Committee on Energy and Natural Resources

A BILL

To promote technology competitiveness and energy conservation in the American steel industry.

1 *Be it enacted by the Senate and House of Representa-*
2 *tives of the United States of America in Congress assembled,*

3 **SECTION 1. SHORT TITLE.**

4 This Act may be cited as the "Steel Technology
5 Competitiveness and Energy Conservation Act of 1988".

6 **SEC. 2. FINDINGS.**

7 The Congress finds that—

8 (1) maintaining a viable steel industry is vital to
9 the national security and economic well being of the
10 United States; and

1 (2) the promotion of technology competitiveness
2 and energy conservation in the American steel industry
3 by the Federal Government is necessary to maintain a
4 viable steel industry.

5 SEC. 3. ESTABLISHMENT OF SCIENTIFIC RESEARCH AND DE-
6 VELOPMENT PROGRAM TO DEVELOP COMPETI-
7 TIVE STEEL MANUFACTURING TECHNOLOGIES
8 AND INCREASE ENERGY EFFICIENCY IN THE
9 STEEL INDUSTRY.

10 (a) DEVELOPMENT AND PUBLICATION OF RESEARCH
11 AND DEVELOPMENT PLAN.—Within 90 days after the date
12 of the enactment of this Act, the Secretary of Energy (here-
13 inafter referred to as the “Secretary”) shall develop and pub-
14 lish a management plan (hereinafter referred to as the
15 “plan”), to be administered and carried out as a part of the
16 Department’s energy conservation programs, for the conduct
17 of the scientific research and development necessary to carry
18 out the purpose of this section. The management plan shall
19 be subject to the following conditions:

20 (1) The Federal financial obligation shall not
21 exceed 70 percent of the total cost of projects in which
22 there is industry participation.

23 (2) The Federal contribution may be up to 100
24 percent of the cost of projects undertaken without in-
25 dustry participation but with the participation of

1 independent laboratories, universities, or non-profit
2 organizations.

3 (3) In selecting projects, the Secretary of Energy
4 shall give priority to projects which include cost-shar-
5 ing or matching grants from State industrial develop-
6 ment sources, industrial, and other non-Federal
7 sources.

8 (4) National laboratories are not required to be
9 involved in every research project.

10 (5) All proprietary rights of the American steel
11 industry shall be protected as provided in section 4.

12 (b) PRIORITIES.—In the conduct of research and devel-
13 opment activities under the plan, priority shall be given to
14 projects primarily involving—

15 (1) the direct production of liquid steel from
16 domestic materials;

17 (2) the production of near-net shape forms from
18 liquid, powder, or solid steel;

19 (3) the development of universal grades of steel;

20 (4) the application of automatic processing
21 technology;

22 (5) the removal of residual elements from steel
23 scrap; and

1 (6) the treatment and storage of waste materials
2 and other by products from steel production and
3 processing.

4 **SEC. 4. PROTECTION OF PROPRIETARY RIGHTS.**

5 (a) **PROPRIETARY RIGHTS.**—Notwithstanding any pro-
6 vision to the contrary in subchapter II of chapter 5 of title 5,
7 United States Code and except as provided in subsection (d),
8 no trade secrets of the American steel industry or commercial
9 or financial information furnished by representatives of such
10 industry on a privileged or confidential basis shall be dis-
11 closed in the conduct of the plan or as a result of activities
12 under the plan.

13 (b) **PATENT RIGHTS VESTED IN UNITED STATES.**—(1)
14 All patent rights from inventions developed under the plan
15 implemented pursuant to this Act shall be vested in the De-
16 partment of Energy. The knowledge resulting for the re-
17 search and development activities conducted under the plan
18 shall be used to the benefit of the domestic steel industry.

19 (2) For purposes of this section, the term “domestic
20 steel companies” means companies which are substantially
21 involved in the United States domestic production of steel
22 and have a substantial percentage of their operations located
23 within the United States.

24 (c) **PATENT LICENSING.**—(1) Domestic companies
25 which are not research participants under this Act may re-

1 ceive licenses from the Department of Energy to the informa-
2 tion and patents generated under the plan. Licensees under
3 this section shall not have the right to sublicense except as
4 necessary for the sale of products or equipment. The Depart-
5 ment of Energy shall charge a reasonable fee for such li-
6 censes. Royalty fees paid under this section shall be equitably
7 distributed among the direct cost-sharing participants and the
8 United States.

9 (2) Patents developed under the plan shall be licensed to
10 participants at a discount in accordance with the percent con-
11 tribution of the participant to the activity generating the
12 patent.

13 (d) EXCEPTION.—The Secretary may exempt for five
14 years any information which he determines would be harmful
15 to the American steel industry if made public, generated as
16 part of the steel initiative at Government laboratories or with
17 Federal funding, from subchapter II of chapter 5 of title 5,
18 United States Code.

19 **SEC. 5. COORDINATION WITHIN DEPARTMENT OF ENERGY.**

20 The Secretary shall coordinate the research and devel-
21 opment conducted under the plan with other research and
22 development being conducted by the Department of Energy,
23 in order to increase efficiency and avoid duplication of effort.

1 SEC. 6. EXPANDED STEEL RESEARCH PROGRAM IN NATIONAL
2 BUREAU OF STANDARDS.

3 The National Bureau of Standards, through its Institute
4 for Materials Science and Engineering and in coordination
5 with the Department of Energy, shall conduct an expanded
6 program of steel research to provide necessary measurement,
7 sensor, and other research in support of activities conducted
8 under the plan.

9 SEC. 7. REPORTS.

10 The Secretary, in consultation with the Director of the
11 National Bureau of Standards, shall prepare and submit an-
12 nually to the President and the Congress (at the close of each
13 fiscal year) a complete report of the research and develop-
14 ment activities carried out under the plan during the fiscal
15 year involved, including the actual and anticipated obligation
16 of funds, for such activities, together with such recommenda-
17 tions as the Secretary may consider appropriate for further
18 legislative, administrative, and other actions (including ac-
19 tions by the American steel industry) which should be taken
20 in order to achieve the purpose of this section. The report
21 submitted at the close of the fiscal year 1993 shall also con-
22 tain a complete summary of activities under the plan from the
23 first year of its operation, along with an analysis of the extent
24 to which it has succeeded in accomplishing the purpose of
25 this Act.

1 SEC. 8. AUTHORIZATION OF APPROPRIATIONS.

2 (a) TO THE SECRETARY.—There are authorized to be
3 appropriated to the Secretary, to carry out the functions of
4 the Department of Energy under this Act, the sum of
5 \$10,000,000 for the fiscal year 1989, \$12,000,000 for the
6 fiscal year 1990, and \$15,000,000 for each of the fiscal years
7 1991, 1992, 1993.

8 ~~(b) TO THE BUREAU.~~—There are authorized to be ap-
9 propriated to the Director of the National Bureau of Stand-
10 ards, to carry out the functions of the Bureau under this Act,
11 the sum of \$3,000,000 for each of the fiscal years 1989,
12 1990, 1991, 1992, 1993.

13 SEC. 9. EFFECTIVE DATE.

14 (a) IN GENERAL.—Subject to subsection (b), this Act
15 shall take effect at the start of the fiscal year 1989.

16 (b) TERMINATION.—This Act and all authority under
17 this Act shall cease to be effective at the close of the fiscal
18 year 1993.

Senator METZENBAUM. Our first witness is Frank Valenta, Cleveland Legislative District Office of the United Steelworkers of America. Pardon me. He is the Director of this region of the United Steelworkers of America, a long-time friend of mine.

I am going to ask each of our witnesses, and, Frank, I hope you can do this, I know it will be tough for you, to confine your remarks to five minutes and the balance of your statement will be put in the record, if that's all right. I am going to ask each witness to do that.

Mr. VALENTA. You want me to read fast.

Senator METZENBAUM. Either read fast or read that important stuff and we'll include all of it in the record.

I am happy to see you, Frank.

STATEMENT OF FRANK VALENTA, DIRECTOR, CLEVELAND LEGISLATIVE DISTRICT OFFICE, UNITED STEELWORKERS OF AMERICA

Mr. VALENTA. Same here, Howard. I think it's most appropriate that we're meeting in Independence, Ohio on Independence Holiday weekend. This is going to certainly enable me to start my celebration of the Fourth of July knowing that we have a branch of our government that's really interested in preserving the American steel industry.

Senator METZENBAUM. In view of the fact that it is the Fourth of July weekend, there will be no fireworks between you and the industry today.

Mr. VALENTA. Definitely. Definitely, Well, I want to point out that the President of the United Steelworkers of America, Lynn Williams, makes an apology for not being able to be here today and he certainly offers his sincere regrets. But the steel industry has a lot of problems, and when the steel industry has problems, so does the United Steelworkers of America. So that's one of the reasons why he is not here today. This particular testimony is really the testimony that he would have given.

So to start out, the Steel Technology Competitiveness and Energy Conservation Act of 1988 introduced by Senator Metzenbaum represents a constant concern about the ability of the American steel industry to obtain and retain a higher level of productivity and, hence, competitiveness.

This concern is heightened by the fact that our domestic producers can no longer focus upon the competitive factors in a self-contained domestic market. The American steel industry is engaged in a global market and its facilities must be world class in quality. Our own market already experiences the presence of non-domestic producers who satisfy at least twenty percent of domestic demand. Furthermore, the emergence of the global steel market brings with it the realization that all those producers are driving for low-cost production.

To a very large extent, that objective is actively promoted—as a matter of public policy and public investment—by the governments of our trading partners.

Furthermore, the vast differential in wage rates, due to a lower standard of living in the countries of some of our foreign suppliers,

necessitates an even greater need to increase productivity in American steel mills, thereby lowering unit labor costs without the damaging destruction of American steelworkers' wage rates, which is the formation of their desired status on the economic ladder.

I am sure that this Committee is aware that so long as there is an excess in global steel capacity and there is a drive for some countries to seek hard currency in order to finance their debts, there will be this very divisive type of competition.

One of the tools in such a competitive battle is investment in research and development. The Metzenbaum bill, by introducing very limited government resources into this effort, contributes to the effectiveness of an appropriate steel research and development program.

Let me be more precise. While economics and producers will discuss R/D concerns in terms of productivity, the Union must view these issues in terms of employment. We are convinced that if the American steel industry does not increase its technological base—either in terms of generating new technology or installing the innovative processes—then there will be a constant decline in jobs and job opportunities in the steel industry.

While in the short term fewer manhours per ton means fewer jobs, the securing of manpower levels in the steel industry is dependent upon the survivability—or competitiveness of the steel industry. In the long term, therefore, our job security depends upon whether the steel industry can be a viable entity in the global market.

Recently I wrote a letter to the author of the bill, which I would like to insert in the record.

Senator METZENBAUM. Without objection that will be included in the record.

Mr. VALENTA. Okay. Thank you.

It is important for me to note that the Union has insisted upon reinvestment in the industry despite any short-term adverse impact on jobs. As a matter of fact, in the Trade and Tariff Act of 1984, we urged that the implementation of steel restraints (VRAs) be conditioned upon a commitment of resources to the modernization of the steel industry.

In 1980, the Carter Administration established a Steel Tripartite Committee—by the way, I happened to be on that initial committee—one of the committees of which was assigned the tasks of reviewing R/D in the steel industry. I am attaching a copy of that report to this testimony. The committee stated that there was a need for a greater degree of multi-firm collaboration and industry-government cooperation in R/D. It is significant that the Tripartite Committee noted the small amount of federal funds which were devoted to steel research and development at that time. The dollar amounts have increased, but the percentage relationships are revealing. And then there are some excerpts from one of the reports from the R/D Committee of the Tripartite Committee.

The committee made another observation which is worth noting, that there is a need for R/D activities to assist in the utilization of basic technologies and not necessarily in "break-through" technology.

In reviewing the priorities set forth in the bill, USWA notes that no mention is made of abatement technology in the field of occupational and environmental pollution. An OTA study, Technology and Steel Industry Competitiveness, also flagged the low level of investment in such technology. And then there are several other excerpts here.

We would suggest that the bill be amended to include that critical level of research and development.

Furthermore, we would suggest that the committee review the advisability of a tripartite monitoring group to evaluate both the investment in, and the utilization of, new technologies.

By the way, Senator, the Union would certainly want to have a place at the table when the committee convenes.

Mr. Chairman, we support Senate Bill 2470. The battle for technological advance in a global economy has already commenced. Recently, the OEDC-Steel Committee has undertaken an examination in the impact of the new technologies upon the OECD and non-OECD countries. While the results are still out, it is important to note that the newly developing countries are attempting to utilize the emerging technology.

Some new technologies offer few specific advantages to newly industrialized countries in that they may almost as easily be implemented in new plants as in the modernization of old plants.

The result of this contest will determine who will be the primary participants in the world markets. But for us in the Union, it will spell whether we can retain steel jobs.

Mr. Chairman, that concludes the remarks.

[The prepared statement of Mr. Valenta follows:]

The Steel Technology Competitiveness and Energy Conservation Act of 1988 (S. 2470) introduced by Senator Metzenbaum represents a constant concern about the ability of the American steel industry to obtain and retain a higher level of productivity and, hence, competitiveness. This concern is heightened by the fact that our domestic producers can no longer be focused upon the competitive factors in a self-contained domestic market. The American steel industry is engaged in a global market and its facilities must be world class in quality. Our own market already experiences the presence of non-domestic producers who satisfy at least 20% of domestic demand. Furthermore, the emergence of the global steel market brings with it the realization that all those producers are driving for low-cost production.

To a very large extent that objective is actively promoted--as a matter of public policy and public investment--by the governments of our trading partners.

Furthermore, the vast differential in wage rates, due to a lower standard of living in the countries of some of our foreign suppliers, necessitates an even greater need to increase productivity in American steel mills, thereby lowering unit labor costs without the damaging destruction of American steelworkers' wage rates which is the formation of

their desired status on the economic ladder. I am sure that this committee is aware that so long as there is an excess in global steel capacity and there is a drive for some countries to seek hard currency in order to finance their debts, there will be this very divisive type of competition.

One of the tools in such a competitive battle is investment in research and development. The Metzenbaum bill, by introducing very limited government resources into this effort, contributes to the effectiveness of an appropriate steel research and development program.

Let me be more precise. While economists and producers will discuss R/D concerns in terms of productivity, the Union must view these issues in terms of employment. We are convinced that if the American steel industry does not increase its technological base--either in terms of generating new technology or installing the innovative processes--then there will be a constant decline in jobs and job opportunities in the steel industry. While in the short term fewer manhours per ton means fewer jobs, the securing of a manpower level in the steel industry is dependent upon the survivability--or competitiveness of the steel industry. In the long term, therefore, our job security depends upon whether the steel industry can be a viable entity in the global market.

Recently I wrote a letter to the author of the bill which I would like to insert in the record at this time.

June 7, 1988

The Honorable Howard Metzenbaum
U. S. Senate
Washington, D.C. 20510

Dear Senator Metzenbaum:

The marketplace for steel is now global and, hence, competitive advantages on an international scale spell the margin of viability for national steel industries. Paramount in the drive for worldwide competitiveness is the role of new technology. Our overseas competitors are strongly aware of this aspect of trade and so are their governments.

American steel mills must accelerate their investments in research and development in order not only to retain their own market, but to secure a position in the international marketplace. Despite a long period of negative returns and losses, the industry has tried to maintain an investment strategy. But the amount of the commitments is inadequate to meet the life-and-death challenges.

Your bill definitely increases the potential for competitiveness and, hence, survivability of the American steel industry. We recognize that jobs in the steel industry have been declining at a drastic rate. Further, productivity on a manhours basis could cause further reductions. However, a steel industry which is more productive could retain its current market share and, indeed, increase it, thereby maintaining or increasing current manpower levels. The converse is equally true-- i.e., a noncompetitive industry means more job losses.

USWA, therefore, supports your initiative to enhance a more affirmative government participation in steel research and development. The industrial base of the U.S. is both the foundation for manpower opportunities and defense

mobilization. The steel sector is a key industry in that base which can be further eroded without a more accelerated investment in research and development. Your legislation would provide an opportunity to advance that need.

Sincerely,

Lynn R. Williams
International President

It is important for me to note that the Union has insisted upon reinvestment in the industry despite any short-term adverse impact on jobs. The Union is not opposed to innovation but rather urges it. As a matter of fact, in the Trade and Tariff Act of 1984, we urged that the implementation of steel restraints (VRAs) be conditioned upon a commitment of resources to the modernization of the steel industry.

In 1980, the Carter Administration established a Steel Tripartite Committee, one of the committees of which was assigned the tasks of reviewing R/D in the steel industry. I am attaching a copy of that report to this testimony. The committee stated that there was a need for a greater degree of "multi-firm collaboration and industry-government cooperation in R/D." It is significant that the tripartite committee noted the small amount of federal funds which were

devoted to steel research and development at that time. The dollar amounts have increased but the percentage relationships are revealing:

"The data show a consistent pattern of low federal support for ferrous metals R/D relative to support by industry. . . . an average of 1.9% support from federal sources would appear low. For one thing, the average level of federal support for total R/D in the U.S. has been 33.8%."

The committee made another observation which is worth noting: there is a need for R/D activities to assist in the utilization of basic technologies and not necessarily in "break through" technology.

In reviewing the priorities set forth in the bill, USMA notes that no mention is made of abatement technology in the field of occupational and environmental pollution. An OTA study, Technology and Steel Industry Competitiveness, also flagged the low level of investment in such technology:

"The steel industry estimates it now spends about 15 percent, or \$75 million, of its annual R/D budget on environmental matters. EPA supports only a small amount of regulatory technology R/D, and OSHA maintains no program in this area."

The committee recommended that:

". . . environmental and occupational safety and health issues should be considered as an integral part of technological research and development in the steel industry. As the steel industry seeks new and more productive steelmaking technologies, it is proper to insure that new production methods, processes

and equipment adequately protect the environment and the safety and health of workers. One of the more significant promises of closed-loop operation of steel plants is the decreased exposure of workers to effluents and working conditions deleterious to health and safety. For this reason, we feel that it is important that further progress in steel technology incorporate specific design features dedicated to protecting worker health and safety."

We would suggest that the bill be amended to include that critical level of research and development. Furthermore, we would suggest that the committee review the advisability of a tripartite monitoring group to evaluate both the investment in, and the utilization of, new technologies.

Mr. Chairman, we support S. 2470. The battle for technological advance in a global economy has already commenced. Recently, the OECD-Steel Committee has undertaken an examination of the impact of the new technologies upon the OECD and non-OECD countries. While the results are still out, it is important to note that the newly developing countries are attempting to utilize the emerging technology:

"Some new technologies offer few specific advantages to newly industrialized countries in that they may almost as easily be implemented in new plants as in the modernization of old plants."

The result of this contest will determine who will be the primary participants in the world markets. But for us in the Union it will spell whether we can retain steel jobs.

Senator METZENBAUM. Thank you very much, Mr. Valenta. And I want to say that the entire statement will be included in the record. Let me ask you just a couple of questions.

Mr. VALENTA. Sure.

Senator METZENBAUM. First, let me make a prefatory comment, because to me it's the substance and the basis of the entire matter that we have before us.

We cannot afford to have America as a number one world power if we don't have a strong steel industry. And whether we like or dislike the way the steel industry operates, or the steel union operates, is no longer the issue. The facts are, this nation must, as a matter of necessity, see to it that we have a powerful, a strong steel industry. And we can never put ourselves in the position of having to say, well, we can rely upon imports, because should there be a confrontation, a global, with another nation, it might be impossible to continue the imports during such a period.

So this Senator has made that position clear before. I have actually urged the steel industry leadership that they publicize that statement to the American people, because I'm not sure that the American people understand it.

Now, my question is: Not only are foreign manufacturers outspending the integrated producers on R and D, so are the mini mills. Without greater R and D expenditures in the integrated sector, couldn't we see further job losses from the mini mills?

Mr. VALENTA. Obviously there will be further job losses, and the steelworkers have certainly taken that into consideration when we decided to be very supportive of R and D programs.

We understand that there is a global market and I think what we have done in contract negotiations in '83 and '86, which were concessionary agreements, is proof positive of the steelworkers' intentions of doing what they can to save the industry.

Also, in 1980 we put into the agreement, the basic steel agreement, a clause that referred to participative management. I would have to say that today in the steel industry, management and labor relations is at its best, the best that it's ever been. So while we understand that jobs can be lost by modernization and instrumentation and technological changes and so on and so forth, it's apparent that either we do these things or there would be more job losses if we didn't.

Senator METZENBAUM. How are the steelworkers responding when companies replace older technologies with modern high-tech equipment?

Mr. VALENTA. Well, we give a lot of consideration to that as we sit down and negotiate our contracts. A perfect example of that is what we did with the new mill that was built here in Cleveland. A mill that certainly could have been built elsewhere, but was built here in complementation to the LTV operations, and that's the electrogalvanizing mill. Now there is a, you know, a full-class mill, state-of-the-art, and so on and so forth. And as we sat down and negotiated the contract for the steelworkers that work in that plant, we readily understood the need for the operators of that facility and we did act accordingly then in the language that we did put into the agreement.

Senator METZENBAUM. Thanks very much, Frank. It's good to have you with us. We're always happy to work with you.

Mr. VALENTA. Thank you.

Senator METZENBAUM. Our next panel will be Dr. Brian Attwood, General Manager of Research, LTV Steel Corporation, on behalf of the American Iron and Steel Institute; Mr. William J. Pendleton, President, Carpenter Technology, and Chairman of the Operating Committee of the Specialty Steel Industry of the United States; and Dr. Gordon Geiger, Executive Vice President, North Star Steel, on behalf of the National Steel Producers Association.

I might say that I have changed the order of panel two and three, because I thought it was particularly important that I have an opportunity to hear the management spokespersons.

I might just say in passing to the management people that there is a certain amount of—there is a certain amount of feedback that I am getting that I don't think it's helpful to the overall thrust to keep everybody on board in the Congress with respect to the legislative process. And that's coming from, I guess what you call the warehouse people or they have another name or something, who feel that they are being driven out of business and that they do have a function to perform in the business.

I pass that on to you as a comment, not because it's particularly relevant to what we're talking about here, but I think that, my view is that in order to keep the ball rolling in the legislative process, you try to get everybody on board and you look for alarm signals when somebody might be off the reservation, because I am hoping to be able to pass this legislation, to get this money through very shortly, and I don't want to lose anybody in the interim.

Dr. Attwood, please proceed. You have heard the five-minute suggestor.

STATEMENT OF DR. BRIAN ATTWOOD, GENERAL MANAGER OF RESEARCH, LTV STEEL CO., ON BEHALF OF THE AMERICAN IRON AND STEEL INSTITUTE

Dr. ATTWOOD. Good afternoon. My name is Brian Attwood. I am the General Manager of Research for LTV Steel, with laboratories located here at the LTV Technology Center in Independence, Ohio. I have a total of 22 years of experience in America's steel industry, including 17 in research and five in quality control. In addition to LTV, I am also representing the American Iron and Steel Institute at this hearing.

We certainly understand the senator's shortage of time today, so we would extend our offer to tour our facilities at your convenience.

Senator METZENBAUM. I appreciate that and I do look forward to doing that.

Dr. ATTWOOD. Thank you. I would first like to state that I strongly support the Steel Technology Competitiveness and Energy Conservation Act of 1988, which will provide expanded government funding for steel research and development programs. There is no question that cooperative efforts such as this between the U.S. government and the steel industry, designed to assist the industry in

its efforts to advance technically, are very much needed and welcomed.

In order to gain some appreciation for this need, I think it's appropriate to review some important facts about the steel industry's economic realities in recent years and then to examine the trends in steel research efforts in the U.S. compared to the efforts of our foreign competitors.

The domestic steel industry has in recent years been awash with red ink, which has resulted in nearly 20 percent of the industry reorganizing under Chapter 11 of the Federal Bankruptcy Code. Between 1982 and 1986 the domestic steel industry reduced its workforce by over 50 percent and suffered financial losses in excess of \$12 billion.

During that period, however, the industry has managed to invest \$7.8 billion in modernization, primarily directed at improved quality and reduced costs. Because customary avenues of capitalization have been blocked due to the lack of profitability, much of the modernization has been funded through asset sales, mergers, joint ventures and licensing agreements.

The result is that the U.S. steel industry now has numerous high-tech facilities in its major plants and is presently engaged in improving upon that technology, optimizing product quality and increasing equipment efficiency.

In the past 20 years, the U.S. steel industry has reduced its research manning from over 4,000 to fewer than 1,000. Conversely, Japan's steel research manning has held steady at over 5,000, while Europe continues to employ research staffs in excess of 6,000.

This reduction in domestic technical effort, combined with the substantial research programs—

Senator METZENBAUM. Excuse me. Let me get that straight. 4,000 went down to 1,000 in our country?

Dr. ATTWOOD. Right.

Senator METZENBAUM. Japan 5,000 and Europe 6,000?

Dr. ATTWOOD. 6,000, right.

Senator METZENBAUM. Thank you.

Dr. ATTWOOD. This, combined with the substantial research programs of off-shore producers, has created a technology gap causing our industry to become primarily a purchaser, rather than an innovator of technology. The domestic steel industry's limited resources have been committed to evaluation and adaptation of Japanese and European technologies into our operations. Specifically, purchases have been made widespread for both equipment and know-how in areas such as vacuum degassing, continuous casting, hot and cold rolling, continuous annealing, and electrocoating, many of the leading edge developments of our industry.

I would like to point out that the picture is not entirely bleak. In areas such as blast furnace performance, continuous casting productivity, high-strength steel products, and electric motor steel developments, the U.S. generally, and LTV Steel in particular, have maintained a technically competitive position.

Turning now to possible solutions to these problems, certainly no one program or legislative action can be expected to correct these difficulties and a multifaceted approach is required.

It will be necessary for our industry to continue to purchase the best available technologies from abroad for the time being, since it makes no sense to waste precious technical talent on reinvention. It is important to remember that even this process requires considerable efforts in refining and adapting technologies to our specific environment and needs. A bright spot here is the proven ability of our engineers to optimize the performance of purchased equipment and in many instances exceed original design expectations. Our experience with continuous casting at LTV Steel is a case in point. I had a number of comments for the record concerning——

Senator METZENBAUM. They will be admitted.

Dr. ATTWOOD [continuing]. Many undertakings with AISI which I think addresses some of these issues. Maybe I can just skip through those and essentially summarize.

With regard to the proposed bill, obviously financial support for research in our industry will assist us in our quest to reestablish the U.S. as a technical leader. It is incumbent upon all of us who have witnessed the growth of off-shore technology to assure that our future efforts are directed towards research which enhances our competitiveness.

For that reason, it is appropriate that each project which is identified for government funding be justified on its own merit, with the primary objective being long-term domestic steel competitiveness. In this context, we would recommend that the priority list in the bill be extended to include a new item: The development of advance coatings for sheet steels. This objective would serve to help us meet the growing needs of our automotive customers in extending the useful lives of their products.

In summary, the rate of technology change within the steel industry and with its customers continues to accelerate rapidly. Although we have made significant strides in optimizing the performance of purchased technology, we are currently non-competitive in research expenditures versus both Japan and Europe. We can expect that the existing technology gap will continue to widen unless expenditures in this area are significantly increased. Thank you.

[The prepared statement of Dr. Attwood follows:]

Testimony of

Dr. Brian Attwood
General Manager of Research
LTV Steel Company

Before The

Committee on Energy and Natural Resources
Sub-Committee on Energy Regulation and Conservation

July 1, 1988

LTV Steel Technology Center
Independence, Ohio

Good afternoon, my name is Brian Attwood, I am the General Manager of Research for LTV Steel, with laboratories located here at the LTV Technology Center in Independence, Ohio. I have a total of 22 years of experience in America's steel industry including 17 in research and five in quality control. In addition to LTV, I am also representing the American Iron and Steel Institute at this hearing.

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In the past 20 years, the U.S. steel industry has reduced its research manning from over 4,000 to fewer than 1,000. Conversely, Japan's steel research manning has held steady at over 5,000 while Europe continues to employ research staffs in excess of 6,000. This reduction in domestic technical effort, combined with the substantial research programs of off-shore producers has created a technology gap causing our industry to

become primarily a purchaser, rather than an innovator of technology. The domestic steel industry's limited resources have been committed to evaluation and adaptation of Japanese and European technologies into our operations. Specifically, purchases have been wide spread for both equipment and know-how in areas such as vacuum degassing, continuous casting, hot and cold rolling, continuous annealing, and electrocoating, many of the leading edge developments of our industry.

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Turning now to possible solutions to these problems, certainly no one program or legislative action can be expected to correct these difficulties and a multifaceted approach is required.

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process requires considerable efforts in refining and adapting technologies to our specific environment and needs. A bright spot here is the proven ability of our engineers to optimize the performance of purchased equipment and in many instances exceed original design expectations. Our experience with continuous casting at LTV Steel is a case in point.

Growth in cooperative research activities certainly offers an attractive way of improving efficiency. Under the sponsorship of the American Iron and Steel Institute (AISI), a number of research initiatives have been recently undertaken. An effort in this regard is the Steel Initiative, a joint program involving the Department of Energy, the steel industry and academia, for the development of direct steelmaking -- a process which will potentially bypass the coke making and blast furnace operations in steel production. Successful development of this project would represent "leapfrog" technology and result in dramatic cost savings. A funding proposal is currently being prepared by AISI and will be submitted to the Department of Energy later this year.

Consistent with cost control and energy conservation objectives, a joint refractory research program is also being pursued through the AISI.

Funding for steel related university research has been initiated with the formation of the Steel Resource Center of Northwestern University. Part of this joint effort -- again supported by the AISI -- is directed toward the development of improved steel formability. These developments will provide new opportunities for automobile manufacturers and others who will benefit through reduced stamping requirements in the production of complex steel shapes. The Steel Resource Center is also engaged in the development of computer "expert systems" for use in the steel industry. These systems will help us to optimize decisionmaking in our operations.

In addition to cooperative research with other steel companies, joint programs have been undertaken with suppliers and customers. Notable among these is the Automotive Steel Partnership, where efforts are focused on joint problem solving and opportunity development in areas such as steel quality, stamping efficiency, on-time-delivery, material utilization and corrosion resistance. This effort encompasses all aspects of the supplier/consumer relationship and targets improved competitiveness for both the steel and automotive industries in the U.S. Significant improvements in performance are being achieved. Material rejects at one auto manufacturer have been reduced from over 8 percent in 1982 to under 1 percent in 1987.

Work with paint suppliers has progressed to the point where preprimed and prepainted steels are routinely used in the manufacture of appliances and are also finding application in automobiles.

Due to the competitive nature of our enterprises, there will always be a requirement for substantial emphasis on independent research, particularly in areas which are commercially sensitive such as product development. However, as my testimony implies, there are and will continue to be opportunities for joint effort on the part of industry, government and academia.

With regard to the proposed Bill, obviously, financial support for research in our industry will assist us in our quest to reestablish the U.S. as a technical leader. It is incumbent upon all of us who have witnessed the growth of offshore technology to assure that our future efforts are directed toward research which enhances our competitiveness. For that reason, it is appropriate that each project which is identified for government funding be justified on its own merit, with the primary objective being long - term domestic steel competitiveness. In this context, we would recommend that the priority list in the bill be extended to include a new item:

the development of advanced coatings for sheet steels. This objective would serve to help us meet the growing needs of our automotive customers in extending the useful lives of their products.

In summary, the rate of technology change within the steel industry and with its customers continues to accelerate rapidly. Although we have made significant strides in optimizing the performance of purchased technology, we are currently non-competitive in research expenditures versus both Japan and Europe. We can expect that the existing technology gap will continue to widen unless expenditures in this area are significantly increased.

(3626S)

Senator METZENBAUM. Thank you very much, Dr. Attwood.

Dr. William Pendleton, President, Carpenter Technology, Chairman of the Operating Committee of the Specialty Steel Industry of the United States.

STATEMENT OF WILLIAM J. PENDLETON, DIRECTOR, CORPORATE AFFAIRS, CARPENTER TECHNOLOGY CORP AND CHAIRMAN, OPERATING COMMITTEE OF THE SPECIALTY STEEL INDUSTRY OF THE UNITED STATES

Mr. PENDLETON. Senator, I am here representing the specialty steel industry of the United States, and it's a real pleasure to be here. What I would like to do is to talk about the critical issue of research and development. I will try to summarize my statement as the other witnesses have done to stay within the five-minute limit.

The domestic specialty steel industry consists of U.S. producers of stainless and heat resisting steels, electrical steel, tool steel, and special alloy steels. The industry employs about 34,000 people and its sales are valued at about \$4 billion annually.

Because of their high alloy content and technical properties, specialty steels have characteristics which are critical for many defense and industrial applications. Indeed, specialty steels are essential for the production of all major U.S. weapon systems, as well as aircraft and other defense-related equipment.

They are critical also as well to many industrial applications, and you can list automotive, pollution control, heating systems and medical equipment in that category.

I think the bottom line is that the health specialty steel industry is vital to the economic well-being of the United States. In many critical applications for stainless steels, heat resisting steels and tooling materials, there are no economic or available substitute materials.

The U.S. specialty steel industry, perhaps uniquely within the steel industry, has long been acknowledged even by our overseas competitors to be technologically and innovatively superior or equal to any offshore competitors. This view has been confirmed in studies by the Office of Technology Assessment, the Commerce Department, the International Trade Commission, as well as the President himself.

The modern high technology nature of the industry should remain true in the future, provided that the industry maintains its commitment to the continued development and refinement of its production processes and products through the application of research and development. And that is absolutely essential, and I think that is consistent with what you are trying to achieve with your legislation.

Let me say now that the recent data that has been collected by the International Trade Commission reflects the extent of the specialty steel industry's past commitment to innovation and development. To try to quantify our commitment to R&D, between the years 1983 and 1985, the industry R&D expenditures amounted to approximately \$37 million per year, or about one and a half to two percent of sales.

In the most recent period, between '85 and '87 those expenditures actually rose to approximately \$42 to \$43 million per year. I'm trying to put it in perspective, specialty steel versus basic steel. Our investment represents about four times that of the general average. That one and a half to two percent represents about four times the general steel industry average of commitment to R&D.

Now, also I am proud of the fact that during that period of '85 to '87 when we were actually increasing our R&D commitment, we were also in a period of cost reduction and modernization, cost reduction, competitiveness. All those factors certainly had an impact on specialty steel, but we have made a commitment to R&D and we have tried to maintain our people and our resources commitment to that area.

I think the fruits of this commitment are shown in, are really shown there in the written statement on page three. We have listed there seven items that we use as an example, key examples of how this commitment to process R&D has paid off in terms of ADD argon, oxygen decarburization concast, vacuum induction melting, vacuum arc remelting and electroslag remelting, and then on into powder metallurgy, powder techniques, rotary forging techniques. We have certainly gauge control systems and descaling systems. All that is summarized there and listed in the written testimony.

Now, I think an important part to keep in mind is that our research and development commitment in specialty steel has not been limited to processes.

Senator METZENBAUM. One minute.

Mr. PENDLETON. One minute. All right. I will wrap it up. And what we emphasize in the new products. I have listed on page four and five of the written statement the examples of companies that have been innovative in terms of new products, specialty products in powder and stainless and special proprietary grades and some other key alloy grades. We're certainly proud of that record.

I think overall, given the commitment of the specialty steel industry to R&D, the commercial opportunities and future are unlimited. R&D is one part, a very important part of the whole equation. There are other variables, fair trade is critical and we appreciate the Senate Steel Caucus and your support of all the fair trade issues. That's very vital.

Profitability is the key to that and we hope that we can generate through profitability the funds to continue our future investments in R&D investments. We wanted to note for the record today the importance of R&D to specialty steel and hopefully we have a good track record to carry forward.

[The prepared statement of Mr. Pendleton follows:]

BEFORE THE
SENATE ENERGY AND NATURAL RESOURCES COMMITTEE
AND THE
SENATE STEEL CAUCUS

TESTIMONY OF WILLIAM J. PENDLETON
ON BEHALF OF THE
SPECIALTY STEEL INDUSTRY OF THE UNITED STATES

July 1, 1988
Independence, Ohio

Mr. Chairman:

My name is William J. Pendleton. I am Director of Corporate Affairs for Carpenter Technology Corporation, a major U.S. producer of stainless and alloy tool steels. I am also Chairman of the Operating Committee of the Specialty Steel Industry of the United States. On behalf of the Specialty Steel Industry of the United States, I am pleased to be here today to discuss the critical issue of research and development in the specialty steel industry.

The Specialty Steel Industry of the United States consists of U.S. producers of stainless and heat resisting steels, electrical steel, tool steel, and special alloy steels. The industry employs approximately 34,000 people, and its products are valued at approximately \$4 billion.

Because of their high alloy content and technical properties, specialty steels have characteristics which are critical for many defense-related and industrial applications. Indeed, specialty steels are essential for the production of all major U.S. weapon systems, as well as aircraft and other defense-related equipment.

On the industrial side, specialty steels, and in particular stainless steels, are used extensively in nuclear power plants, pulp and paper plants, and chemical processing plants. Furthermore, because of their corrosion resistant qualities, stainless steels are used throughout the food and beverage processing industries. Other significant applications include automotive exhaust systems, industrial pollution control devices, home heating systems, and medical equipment, where uses range from the production of surgical equipment to various surgical implant devices. A healthy specialty steel industry is vital to the economic well-being of the United States. In many critical applications for stainless steels, heat resisting steels and tooling materials, there are no economic or available substitute materials.

The U.S. specialty steel industry, perhaps uniquely within the steel industry, has long been acknowledged even by our overseas competitors to be technologically and innovatively superior or equal to any offshore competitor. This view has been confirmed in studies by the Office of Technology Assessment, the Commerce Department, and the International Trade Commission. Significantly, President Reagan himself noted that:

The specialty steel industry is an efficient, technologically up-to-date and export-oriented branch of the steel industry. Its output is used in a wide range of demanding applications critical to an industrial economy.

These words rang true in November 1982 when they were uttered following an in-depth, two year study of the industry. They are true today. And they should remain true in the future, provided that the industry maintains its commitment to the continued development and refinement of its production processes and products, through the application of research and development.

Recent data collected by the U.S. International Trade Commission reflect the extent of the industry's past commitment to innovation and development. Between 1983-1985, industry research and development expenditures amounted to approximately \$37 million per year or 1 1/2 to 2 percent of sales. In 1986 and 1987, those expenditures rose to approximately \$42-\$43 million per year. The current advanced state of technology in the industry is a direct result of these significant research and development efforts. The fruits of these past efforts are indeed impressive:

1. The use of argon/oxygen decarburization or vacuum oxygen decarburization for the production of most specialty steels.
2. The almost exclusive use of continuous casting to produce stainless corrosion resistant and some electrical steels. Almost all stainless steels for flat-rolled products are now continuously cast.

3. The development and use of vacuum induction melting, vacuum arc remelting and electroslag remelting techniques for special purpose alloys for high technology applications. These techniques are used in superalloys for gas turbine engines, for special tool steels, and for some electrical alloys.
4. The development of powder techniques applied to superalloys and to tool steels.
5. The use of new forging techniques in the production of special alloys. Among these techniques is the use of large GFM forging machines.
6. The installation of modern computer controlled gauge control systems on both flat rolling mills and on bar mills.
7. The development and use of new descaling systems that allow lower acid usage and minimize environmental problems with waste water treatments.

The advances made by this industry, however, are not limited to the mere development of new and more efficient processes. Much of the R&D in this industry is directed at the development of new products to meet the changing needs of our customers. For example, in the powder metallurgy area, the Cytemp Specialty Steel Division of the Cyclops Corporation, through the application of its consolidation by atmospheric pressure process, has been able to produce a specialty powder, which is

thermally sprayed on a component to enhance surface characteristics such as wear, corrosion or oxidation resistance. The thermal spray coating process is offering new opportunities for gas turbine engine manufacturers to increase the longevity of critical parts. Armco, Inc., a major stainless producer has developed a line of Nitronic stainless steels to be used in aircraft hydraulic tubing, boat shafting, underground electrical transmission lines, electrical pole line hardware, medical diagnostic devices and nuclear applications. These alloys are particularly useful because of their non-magnetic qualities. Another major U.S. producer, Allegheny Ludlum has developed a number of proprietary grades of ferritic stainless steels for use in automotive exhaust systems as well as a number of new proprietary alloys which have become the materials of choice for secondary heat exchangers and for condenser tubing in power generation plants. My own company, Carpenter Technology, has recently developed two new alloys of which we are quite proud. The first, 7 Mo Plus, is a duplex stainless steel with higher strength and better corrosion resistance than traditional austenitic stainless steels. This alloy is finding applications in the chemical, petrochemical and marine industries. A second alloy, Custom Age 625 Plus, is a precipitation, hardenable nickel-based alloy, which is essential to the production of deep sour natural gas reserves. Such examples of new product developments are typical of what is occurring throughout the entire industry.

Given the commitment of the specialty steel industry to R&D, the commercial opportunities for the future are unlimited. But, R&D is only one part of the corporate equation. In truth, the industry will not stay healthy unless all variables of the equation are satisfied. In particular, our specialty steel industry must have an opportunity to make a profit when it is technically up-to-date and operating at maximum efficiency. This is the only way the industry can generate the resources to make future investments in R&D and investments for the utilization of that R&D. It is also the only way the industry can maintain its technical health and competitive position in the next decade.

Senator METZENBAUM. Well, this Senator certainly supports the concerns you have expressed relative to R&D in the specialty steel field. I am sure you know that Senator Heinz and I led the fight to preserve the Pentagon's Buy American policy with respect to specialty steel, because we do believe that there is a strategic importance of a healthy specialty steel industry in the United States and I am happy to say that we prevailed, but I feel very proud of that fact.

Our third witness on this panel is Dr. Gordon Geiger, Executive Vice President, North Star Steel, on behalf of the National Steel Producers Association.

STATEMENT OF DR. GORDON H. GEIGER, EXECUTIVE VICE PRESIDENT, NORTH STAR STEEL, ON BEHALF OF THE NATIONAL STEEL PRODUCERS ASSOCIATION

Dr. GEIGER. Thank you, Senator. I am glad to be able to be here and present my views on your bill of S. 2470, which the National Steel Producers Association supports, as does North Star Steel and myself. I would like to just make one or two comments from the record and then perhaps synopsize my written comments.

I have been involved with the steel industry for 32 years in one way or another, including being a professor, being a full-time researcher and as an executive and did serve as Chairman of the Advisory Panel to the OTA, which resulted in that 1980 report that was referred to earlier as Technology and Steel Industry Competitiveness.

I think your bill is a good bill and it begins to address some of the issues that we need to address. What I'd like to do is synopsize my comments in here, if I may.

A couple of points I'd like to make. The U.S. Government, through the Department of Energy, the Department of Defense, the Department of the Interior, through the Bureau of Mines, the Department of Commerce, through NBS, the National Science Foundation and NASA spends at least \$200 million a year on steel-related research.

It's hard to find a good number, and we have attempted to do that, but we know it's at least that much. Unfortunately, there is no coordination of this research and not any particularly significant agreement that's needed, that some of it's needed or useful. An administration of that research by government agencies through consultants and themselves when they're not involved in the industry is very inefficient and often leads to some uninformed decisions and very slow decision making.

It's really not comparable to the kind of thing where the Department of Defense, where the Department of Defense is the customer and therefore knows the business that it's dealing with in terms of giving contracts. So we have the government in the position of making decisions as to what's best for the industry, but not being part of the industry.

The government owns—The third point is that the government itself owns a lot of capital equipment scattered throughout government laboratories, much of which makes pilot plant capability realistic if it was all put in one place.

This equipment is under-utilized. And so one possibility to consider, which is not considered yet in the bill, would be to bring some of this equipment into a central facility.

The problem in this country is not basic research. We do a lot of good basic research and every study that I have been involved with, whether through the National Academy of Engineering or others who have looked at it, agree that basic research is good in this country. Our problem is commercializing that basic research, the scale up, the steps between the basic work and the full scale products, commercial products, and that is the big cost area.

To run a pilot plant operation costs tens of millions of dollars, and that's the step that we are not making in this country, not easily, that's the expensive step. It has to be coordinated furthermore with marketing and with customers, and we don't tend to involve the customers' side very much when we support research in these areas through the government.

A central coordination of this work could help to do that. In my written testimony I have proposed the formation of such a central research facility. The Europeans, as my colleagues have mentioned, far outspend us and, furthermore, every one of them, and I have listed them in here, have government supported steel research laboratories where there is coordinated but government supported research done on behalf of the steel industry and for steel consumers.

This is true in all of the European countries, or most all of them. It's also true in Brazil and India and in the People's Republic of China. It's also true in Russia and East Germany.

In fact, as my colleagues have pointed out, an awful lot of the new technology that we use, and I come from the mini mill sector of the business, but it's the mini mill sector that covers a range of products, from the reinforcing bar at the least technology end to high quality bearing steels and automotive steels at the high technology end and seamless pipe. We have used technology from Japan, Italy, Germany, France, Sweden and Russia.

There is an excellent model available that one could look at for the formation of such a research center, and that's the Gas Research Institute. Gas, GRI derives its funding by Congress. It's managed well. It's managed by a professional group that know how to manage this kind of research and development with goals set of commercial product and implementation to help an industry. I think one could look at that and I think it's worth looking at as a potential.

So in summary, what I'd like to say is that I believe S. 2470 begins to address some of the problems. It directs coordination between the Bureau of Standards and the Department of Energy Steel Research. It addresses the needs for proprietary rights flowing to those who need an incentive to commercialize the results. Unfortunately, it still leaves in place management totally by the government and it doesn't address the issue of involvement in the management by steel consuming industries and ignores the efficient use of government owned pilot plant capital equipment.

I also believe it's too specific in defining priorities for that research, which I think are better left to a knowledgeable board of directors of some sort of a found.

[The prepared statement of Dr. Geiger follows:]

TESTIMONY BY

DR. GORDON H. GEIGER
SENIOR VICE PRESIDENT
TECHNOLOGY, QUALITY & RESEARCH
CARGILL, INCORPORATED
MINNEAPOLIS, MINNESOTA

BEFORE THE

SUBCOMMITTEE ON ENERGY REGULATION AND CONSERVATION
OF THE
U.S. SENATE COMMITTEE ON ENERGY AND NATIONAL RESOURCES

JULY 1, 1988

I AM PLEASED TO HAVE THIS OPPORTUNITY TO PRESENT MY VIEWS TO YOUR SUBCOMMITTEE ON THE SUBJECT OF STEEL RESEARCH AND IN PARTICULAR S-2470. THE VIEWS EXPRESSED ALSO REPRESENT THE OPINION OF NORTH STAR STEEL PRESIDENT BOB GARVEY, WHO SERVES AS PRESIDENT OF THE NATIONAL STEEL PRODUCERS ASSN. THE NATIONAL STEEL PRODUCERS ASSOCIATION SUPPORTS SEN. METZENBAUM'S BILL, S-2470.

BY WAY OF BACKGROUND AND QUALIFICATIONS, IN ADDITION TO MY CARGILL DUTIES, I AM EXECUTIVE VICE PRESIDENT OF NORTH STAR STEEL, A CARGILL SUBSIDIARY. NORTH STAR STEEL IS THE LARGEST MINI-MILL COMPANY IN THE UNITED STATES WITH CURRENT PRODUCTION CAPACITY OF 2.7 MILLION TONS OF CONTINUOUSLY CAST STEEL. ITS PRODUCTS RANGE FROM REINFORCING BAR, WIRE ROD AND STRUCTURAL SHAPES TO SPECIAL QUALITY FORGING AND AUTOMATIVE BARS AND SEAMLESS, OIL-COUNTRY PIPE.

PRIOR TO JOINING NORTH STAR STEEL IN 1983, I WORKED FOR THE CHASE MANHATTAN BANK AS VICE PRESIDENT AND TECHNICAL DIRECTOR FOR STEEL-RELATED LENDING. THE MAJORITY OF MY CAREER BEFORE THAT WAS SPENT IN THE ACADEMIC WORLD AS A PROFESSOR AND DEPARTMENT HEAD OF METALLURGICAL ENGINEERING. DURING THAT TIME I CONSULTED FOR AND CONDUCTED INDUSTRY-SUPPORTED RESEARCH ON MANY STEEL-RELATED PROCESSES. THE RESEARCH WAS ALWAYS DONE WITH GRADUATE STUDENTS AND RESULTED IN 15 PH.D.S AND 35 M.S. DEGREES BEING GRANTED TO THEM. I ALSO SERVED AS CHAIRMAN OF THE ADVISORY PANEL TO THE OFFICE OF TECHNOLOGY ASSESSMENT WHICH RESULTED IN THE 1980 REPORT TO CONGRESS ON TECHNOLOGY AND STEEL INDUSTRY COMPETITIVENESS. I ALSO SPENT FULL-TIME IN STEEL-COMPANY RESEARCH LABORATORIES ON SEVERAL OCCASIONS.

I GIVE YOU THIS BACKGROUND TO INDICATE THAT I HAVE HAD EXPERIENCE IN STEEL-INDUSTRY PROCESSES, PRODUCT DEVELOPMENT AND RESEARCH THROUGHOUT MY CAREER.

THE 1980 OTA REPORT QUITE PROPERLY IDENTIFIED THE OVERWHELMING NEED FOR TRADITIONAL, INTEGRATED STEEL COMPANIES TO MODERNIZE TECHNOLOGICALLY IN ORDER TO COMPETE. IN PARTICULAR, IT IDENTIFIED THE NEED FOR MORE CONTINUOUS CASTING AND MODERNIZED ROLLING-AND-FINISHING EQUIPMENT. SINCE THAT REPORT, THE INDUSTRY HAS INVESTED IN THESE TYPES OF FACILITIES.

BUT--EQUALLY IMPORTANT--IT HAS CLOSED OBSOLETE MILLS THAT NO AMOUNT OF ADDITIONAL INVESTMENT WOULD HAVE REVITALIZED AND ON WHICH INVESTMENT COULD NOT HAVE BEEN REPAID BECAUSE OF EXCESS CAPACITY. IT SHOULD BE POINTED OUT, HOWEVER, THAT A SIGNIFICANT AMOUNT OF NEW INVESTMENT HAS BEEN FINANCED BY FOREIGN FINANCIAL INSTITUTIONS OF FOREIGN STEEL COMPANIES AND INVOLVE MAJOR DEBT LOADS FOR THE OWNERS.

MOST OF THE NEW TECHNOLOGY BEING PURCHASED AND INSTALLED IN THE AMERICAN STEEL INDUSTRY TODAY IS DESIGNED, DEVELOPED AND ENGINEERED OVERSEAS, PARTICULARLY IN EUROPE. AS AN EXAMPLE, IN OUR RECENTLY BUILT SEAMLESS PIPE MILL IN YOUNGSTOWN, OHIO, WE UTILIZED THE BEST COMBINATION OF EQUIPMENT THAT WE COULD FIND. IT TURNED OUT TO INCLUDE A REHEAT FURNACE FROM ITALY, A SAW FROM RUSSIA, A PIERCER FROM GERMANY, A PIPE MILL FROM ITALY AND A SIZING MILL FROM GERMANY. THIS IS NOT UNUSUAL.

THE REASON FOR THIS IS THE WEAKENED FINANCIAL CONDITION OF THE AMERICAN STEEL INDUSTRY. THAT CONDITION HAS NOT ALLOWED IT TO PARTICIPATE IN THE DEVELOPMENT OF NEW TECHNOLOGY CONCEIVED BY THE AMERICAN CAPITAL GOODS INDUSTRY, WHICH HAS HISTORICALLY BEEN THE SOURCE OF MUCH OF THE INDUSTRY'S NEW TECHNOLOGY. SUCH FIRMS AS ALLIS-CHALMERS, DROVE, A.G. MCKEE, LECTRO-MELT, PENNSYLVANIA ENGINEERING, MESTA MACHINE, WEAN-UNITED, SWINDELL FURANCE CO. AND E.W. BLISS USED TO RUN PILOT PLANTS WHERE THEY WOULD DEVELOP NEW PROCESSES TO SELL TO THE INDUSTRY. LARGE SCALE TRIALS OF NEW PROCESSES REQUIRED FUNDS ON THE ORDER OF MILLIONS OF DOLLARS. IN THE PAST, THAT INVOLVED COST SHARING BY THE CAPITAL GOODS COMPANIES AND THE STEEL INDUSTRY. TODAY ALL OF THE COMPANIES MENTIONED ABOVE HAVE EITHER DISAPPEARED THROUGH BANKRUPTCY, MERGED OR BEEN PURCHASED BY OTHERS OR HAVE SHRUNK IN SIZE. THEIR MANUFACTURING AND PILOT-TEST FACILITIES HAVE BEEN ELIMINATED OR DRASTICALLY REDUCED ALONG WITH THEIR ACTIVITIES IN NEW-PROCESS DEVELOPMENT.

NOW I WOULD LIKE TO TELL YOU A BIT OF STEEL-RESEARCH HISTORY THAT ILLUSTRATES SOME OF THE POINTS I WANT TO MAKE IN MY REMARKS.

ABOUT 25 YEARS AGO A NUMBER OF VERY CAPABLE RESEARCHERS FROM SEVERAL AMERICAN STEEL COMPANIES BANDED TOGETHER TO FORM A JOINT VENTURE RESEARCH ORGANIZATION WITH THE U.S. BUREAU OF MINES TO STUDY HOW THE IRON BLAST FURNACE WORKS. FUNDING WAS JOINT INDUSTRY AND GOVERNMENT AND THE WORK WAS DONE AT THE BRUCETON PILOT FACILITY OF THE BUREAU. MUCH GOOD DATA CAME FROM THAT PROJECT, PAVING THE WAY FOR IMPROVEMENTS ON FULL-SCALE FURNACES. UNFORTUNATELY, NO ONE IN THE INDUSTRY CAN THINK OF ANYTHING ANYWHERE NEAR AS USEFUL THAT HAS BEEN DONE FOR OR WITH THE INDUSTRY BY THAT GOVERNMENT AGENCY SINCE.

ANOTHER LESSON INVOLVES THE PURCHASE OF A ROTARY FORGE BY THE U.S. ARMY. THE ARMY INSISTED THAT IT BE LOCATED AT WATERVLIEET ARSENAL, WHERE ITS UTILIZATION WOULD BE NEGLIGIBLE, INSTEAD OF LOCATING IT AT AN INDUSTRIAL PLANT WHERE ALL THE GUN BARREL STEEL FOR THE ARSENAL IS MELTED, CAST, FORGED AND TREPPANNED. THE INDUSTRIAL PLANT WOULD HAVE PAID THE U.S. GOVERNMENT A CONSIDERABLE AMOUNT OF RENT TO FULLY UTILIZE THE EQUIPMENT TO MAKE COMMERCIAL PRODUCTS AS WELL AS SUPPLY ALL THE MILITARY NEEDS WITH ONLY ABOUT 10% OF THE UNIT'S CAPACITY. SO NOW, INSTEAD OF BEING INTEGRATED WITH ESR, HEAT-TREATING, PRESS-FORGING AND OTHER TECHNOLOGY, THAT PIECE OF EQUIPMENT SITS ISOLATED IN GLORIOUS SOLITUDE IN A GOVERNMENT LABORATORY.

DURING THE PAST 12 YEARS, THE AMERICAN STEEL INDUSTRY'S COLLECTIVE AVERAGE FOR RESEARCH-AND-DEVELOPMENT SPENDING HAS WAVERED BETWEEN 0.5 AND 0.6 PERCENT OF TOTAL SALES. THE UNITED STATES STEEL INDUSTRY IS SECOND ONLY TO JAPAN IN SPENDING ON STEEL RESEARCH, BUT THE JAPANESE ARE SPENDING ALMOST TWICE WHAT WE DO. JAPANESE STEELMAKERS HAVE INVESTED AN AVERAGE OF SLIGHTLY MORE THAN 1 PERCENT OF TOTAL SALES ON RESEARCH AND DEVELOPMENT SINCE 1975.

THE RECENT ANNUAL FORECAST OF THE BATTELLE MEMORIAL INSTITUTE ESTIMATES THAT TOTAL FUNDING FOR U.S. IRON AND STEEL RESEARCH DURING 1988 WILL TOTAL \$724 MILLION. OF THAT TOTAL, BATTELLE SAYS THAT INDUSTRY WILL INVEST \$505 MILLION, WITH FEDERAL AGENCIES SPENDING \$219 MILLION. THAT'S SIGNIFICANT MONEY, BUT SMALL POTATOES COMPARED TO BATTELLE'S PROJECTION FOR TOTAL U.S. RESEARCH-AND-DEVELOPMENT FUNDING OF \$131.5 BILLION. THAT MEANS THAT THE UNITED STATES IS SPENDING JUST OVER ONE-HALF OF ONE PERCENT OF TOTAL RESEARCH FUNDS ON STEEL-RELATED RESEARCH.

I RECENTLY SERVED ON AN NMAB PANEL, ONE OF MANY INVOLVED IN ANOTHER OF THE SEEMINGLY ENDLESS SERIES OF STUDIES OF MATERIALS POLICY UNDERTAKEN IN THE PAST TWO DECADES, IN WHICH WE EXAMINED, VIA A SERIES OF CASE STUDIES, HOW, OR INDEED IF, MATERIALS TECHNOLOGY HAS AN IMPACT ON THE NATIONAL ECONOMY. I'VE NOT SEEN THE FINAL DRAFT OF THAT REPORT, BUT I CAN TELL YOU MY OWN CONCLUSIONS. IT WAS QUITE CLEAR THAT, TIME-AFTER-TIME, AMERICAN BASIC RESEARCH BECAME THE BASIS FOR JAPANESE COMMERCIAL PRODUCTS RATHER THAN AMERICAN.

IT WAS ALSO CLEAR THAT PRIMARILY ONLY PROJECTS PROTECTED FROM MARKET RISK, I.E., FUNDED BY THE DEFENSE DEPARTMENT OR BY PROFIT-GUARANTEED GOVERNMENT-REGULATED ORGANIZATIONS SUCH AS BELL LABS, WERE SUCCESSFUL IN REACHING TECHNOLOGICAL FRUITION. AND IN MANY OF THOSE CASES, THE SUBSIDY REQUIRED BY THE TAXPAYERS TO PRODUCE THE FEW POUNDS OF ANNUAL PRODUCT INVOLVED WAS HUGE. FEW COULD BE CONSIDERED COMMERCIAL SUCCESSES THAT HAD SIGNIFICANT IMPACT ON THE ECONOMY.

SO HERE WE ARE WITH THE GOVERNMENT APPARENTLY SPENDING A LOT OF MONEY ON STEEL-RELATED RESEARCH AND DEVELOPMENT AND WHAT ARE GETTING FOR IT? TO ME, THE RESULTS ARE INVISIBLE. SO I ASKED THE CARGILL INFORMATION CENTER TO SURVEY A WHOLE SERIES OF GOVERNMENT AND UNIVERSITY LABORATORIES, AGENCIES AND OFFICES TO GET SOME SPECIFICS ON HOW MUCH IS BEING SPENT AND, IN GENERAL TERMS, ON WHAT TOPICS.

THE RESULTS OF THAT SURVEY ARE PAINFUL TESTIMONY TO THE LACK OF COMMUNICATIONS AND COORDINATION IN THOSE RESEARCH ENDEAVORS. WE TRIED TO GET RESPONSES TO GENERAL QUESTIONS. WE WEREN'T ATTEMPTING TO STEAL TRADE SECRETS. WE ASKED:

1. WHAT ARE THE MAJOR TYPES OF STEEL OR METALS RESEARCH GOING ON IN YOUR LAB?
2. WHAT IS THE ORDER OF MAGNITUDE OF SPENDING ON THIS RESEARCH?
3. WHAT AREAS OF METALS RESEARCH NEED TO OR SHOULD BE DONE THAT ARE NOT BEING DONE NOW?

ANSWERS RECEIVED INDICATED TO US THAT THERE IS NO COORDINATION OF RESEARCH ENDEAVORS WITHIN THE GOVERNMENT AND NO CONCEPT OF TOTAL STEEL RESEARCH FUNDING OR AGREEMENT AS TO PRECISELY WHAT AREAS OF RESEARCH NEED TO BE INVESTIGATED. I CAN ONLY CONCLUDE, ON THE BASIS OF THE FEW NUMBERS I WAS ABLE TO GET, THAT BATTELLE'S ESTIMATE OF \$219 MILLION IS PROBABLY NOT TOO FAR OFF, WITH ABOUT \$15 MILLION AT THE BUREAU OF MINES, SEVERAL MILLION EACH AT NBS AND NSF AND THE LARGEST AMOUNT AT DOE AND BY DOD. NONE APPEARS TO KNOW MUCH ABOUT WHAT THE OTHERS ARE DOING, OR TO EVEN CARE. THEY ARE SIMPLY SPENDING THEIR POT, APPARENTLY ON THEIR IDEAS OF IMPORTANT TOPICS.

ANOTHER STORY. ABOUT FOUR YEARS AGO, WE AT NORTH STAR STEEL BECAME AWARE OF AND INTERESTED IN THE COMMERCIAL POTENTIAL OF SUPER-PLASTIC STEELS. WE SPENT TIME WITH PROF. SHERBY OF STANFORD UNIVERSITY WHO HAD CONDUCTED THE BASIC LABORATORY SCALE RESEARCH ON THIS CLASS OF STEELS FOR A DOZEN YEARS UNDER THE AUSPICES OF THE ARMY RESEARCH OFFICE. BELIEVING THAT THE POTENTIAL OF SUCH STEELS WAS GREAT, BUT RECOGNIZING THAT CONSIDERABLE WORK WOULD BE REQUIRED TO SCALE-UP THIS MATERIAL TO COMMERCIAL SCALE FROM BENCH SCALE, WE APPROACHED THE TANK AUTOMOTIVE COMMAND. WE THOUGHT THEY MIGHT PROBABLY BE AWARE OF THIS WORK, SO OFFERED TO ASSIST IN PRODUCING COMMERCIAL SCALE MATERIAL FOR TEST AND EVALUATION FOR CRITICAL PROPERTIES SUCH AS WEAR RESISTANCE AND FORGEABILITY.

TO OUR SURPRISE, THEY WERE UNAWARE OF THE WORK SPONSORED BY THEIR SISTER ORGANIZATION AND, OF COURSE, WE GOT NOWHERE WITH THEM. THE MUCH HAPPIER SEQUEL IS THAT WE HAVE FINALLY FORMED A CONSORTIUM WITH LADISH, CATERPILLAR AND LAWRENCE LIVERMORE LAB UNDER THE STEEL INITIATIVE UMBRELLA TO PROCEED WITH THIS DEVELOPMENT. THAT ONLY TOOK A YEAR.

THUS, WE APPEAR TO HAVE SEVERAL SERIOUS PROBLEMS:

1. DIFFICULTY IN MOVING FROM BASIC RESEARCH TO COMMERCIAL REALITY.
2. LACK OF DIRECTION AND COORDINATION OF STEEL-RELATED RESEARCH BY VARIOUS GOVERNMENT AND UNIVERSITY LABORATORIES.
3. AN INEFFICIENT SCATTERING OF PHYSICAL FACILITIES FOR PILOT SCALE DEVELOPMENT AMONG MANY LOCATIONS.
4. AN INEFFICIENT SCATTERING OF FUNDING.

I WAS CONCERNED AS I REACHED THESE CONCLUSIONS THAT PERHAPS I WAS BEING TOO HARSH, BUT THEN I WAS ABLE TO TAKE COMFORT FROM THE PAPER WRITTEN BY VICTOR RADCLIFFE AT AN AIME MEETING IN 1984. IN THAT PAPER ENTITLED "FORESIGHT, MATERIALS RESEARCH AND NATIONAL POLICY," HE SAID THAT "THOSE OF YOU WHO HAVE SPENT ANY TIME IN THE FEDERAL GOVERNMENT WILL FIND IT HARD TO MATCH THE ACTUAL PRACTICE OF GOVERNMENT POLICY WITH THE FORMAL DEFINITION OF POLICY AS INTELLIGENTLY DIRECTED ACTION TOWARDS

CONSCIOUSLY DETERMINED GOALS, AS DISTINCT FROM AIMLESS DRIFT AND BLIND FAITH." AFTER REVIEWING ALL THE VARIOUS MATERIALS POLICY STUDIES FROM COSMAT ON AND COMPARING THEM TO ACTUAL PERFORMANCE HE CONCLUDED:

1. THAT TOTAL FEDERAL FUNDING FOR MATERIALS RESEARCH AND DEVELOPMENT HAD BARELY INCREASED FROM 1976 THROUGH 1983 AND HAD DECREASED 30% IN CONSTANT DOLLAR TERMS, AND
2. IT WAS OBVIOUS THAT THERE HAD NOT BEEN A CHANGE IN GOVERNMENT SPENDING EMPHASIS, CORRESPONDING TO THE RECOMMENDED PRIORITIES, EVEN THOUGH INDUSTRY HAD CHANGED ITS PRIORITIES. IN OTHER WORDS, BUSINESS AS USUAL ON THE OLD PET PROJECTS.

ONE FACTOR THAT CONTRIBUTES TO THE LACK OF COMMUNICATION AND PRACTICALITY IN STEEL RESEARCH IS THE OBSESSION OF UNIVERSITY RESEARCHERS WITH DEVELOPING ONLY NEW OR FUNDAMENTAL DATA THAT CAN BE PUBLISHED. AS THE FORMER HEAD OF A UNIVERSITY SCHOOL OF METALLURGY, I'M AWARE OF THE PRESSURE TO "PUBLISH OR PERISH." I ALSO KNOW THAT WITHIN MANY UNIVERSITY METALLURGICAL SCHOOLS IT'S A LIABILITY TO PUBLISH PRACTICAL RESEARCH. PRACTICAL RESEARCH OFTEN DOESN'T MEET THE REQUIREMENTS FOR PUBLICATION IN A PRESTIGIOUS PEER-REVIEW PUBLICATION LIKE METALLURGICAL TRANSACTIONS.

THE ATTITUDE OF MANY FACULTY MEMBERS, WHICH ALSO IS REFLECTED IN THE UNIVERSITY'S INCENTIVE STRUCTURE, IS TO EXPLORE KNOWLEDGE FOR ITS OWN SAKE AND TO DISSEMINATE RESEARCH FINDINGS THROUGH PUBLICATION. INDUSTRY MANAGERS, ON THE OTHER HAND, TEND TO BE CONCERNED PRIMARILY WITH PRODUCTS THAT HAVE COMMERCIAL APPLICATIONS.

ONE ADMINISTRATOR OF A UNIVERSITY RESEARCH AND TECHNOLOGY PARK ACCURATELY SUMMARIZED OTHER OBSTACLES THAT INHIBIT TRANSFER OF BASIC RESEARCH TO THE PRIVATE SECTOR IN A RECENT CONFERENCE BOARD STUDY. HE WROTE:

"CONSULTING WITH INDUSTRY IS NOT AN IMPORTANT CRITERION FOR PROMOTION, MERIT INCREASES, OR TENURE IN THE UNIVERSITY SYSTEM. IN FACT, MOST UNIVERSITIES HAVE EXPLICIT OR IMPLICIT POLICIES AGAINST IT. THE SAME IS TRUE WITH APPLIED RESEARCH AND CONTRACT RESEARCH WITH RESPECT TO INDUSTRY. IT IS NOT ENCOURAGED AND DOES NOT RECEIVE THE SAME KIND OF POSITIVE EVALUATION THAT BASIC RESEARCH DOES."

PLEASE DON'T MISUNDERSTAND ME. THESE ARE GOOD PEOPLE, WELL-GROUNDED IN THE THEORY OF THEIR PROFESSION. HOWEVER, MOST LACK THE PRACTICAL INDUSTRIAL EXPERIENCE THAT WOULD ALLOW THEM TO UNDERSTAND MORE FULLY THE RESEARCH RESULTS THAT INDUSTRY NEEDS FROM THE PROJECTS THEY FUND. I WOULD LIKE TO SEE THE MAJORITY OF UNIVERSITY METALLURGISTS SPEND A MINIMUM OF TWO YEARS WORKING FULL-TIME IN INDUSTRY. THAT EXPOSURE WOULD PREPARE THEM TO DESIGN RESEARCH WITHIN THE UNIVERSITY SETTING THAT WOULD HELP ADVANCE THE PRACTICAL ART OF STEELMAKING, PROCESSING AND APPLICATION.

IN CANADA, THE NATIONAL RESEARCH COUNCIL ENCOURAGES COORDINATION OF UNIVERSITY RESEARCH WITH INDUSTRY, AND SCHOOLS OF METALLURGY PREFER AND SEEK FACULTY MEMBERS WITH SOLID BACKGROUNDS WITHIN THE STEEL INDUSTRY. AS A RESULT, VIRTUALLY ALL OF THE TOP ACADEMIC EXPERTS USED BY THE PROCESS SIDE OF THE STEEL INDUSTRY ARE FROM CANADIAN SCHOOLS.

A RECENT CONFERENCE BOARD STUDY OF "THE KEYS TO U.S. COMPETITIVENESS" NOTED THAT BUSINESS SHOULD ASSIST UNIVERSITY ENGINEERING DEPARTMENTS WITH CURRICULUM DEVELOPMENT BY PROVIDING INSIGHTS INTO INDUSTRY'S TECHNOLOGICAL NEEDS. IT ALSO CONTAINED THE RECOMMENDATION THAT "UNIVERSITIES COULD BE OF MORE AID IF THEY CONCENTRATED ON REAL WORLD PROBLEMS. THEY NEED TO BE MUCH MORE INVOLVED WITH TYPICAL INDUSTRIAL-R&D PROBLEMS, SO THAT WHEN THEY FACE A DECISION POINT THEY CAN TAKE A PATH THAT MAY HAVE A SOLUTION TO AN INDUSTRIAL PROBLEM AT THE END. THEY SHOULD CONCENTRATE ON INCREASING THE PRODUCT-DEVELOPMENT SKILLS OF ENGINEERS AND SCIENTISTS." I WOULD ADD THAT THE SAME COULD BE SAID OF GOVERNMENT SCIENTISTS AND LABORATORIES.

I AM NOT OPPOSED TO A CERTAIN AMOUNT OF BASIC OR UNDIRECTED RESEARCH, PARTICULARLY AT UNIVERSITIES. BUT A LITTLE DIRECTION AND A LOT MORE PRACTICAL KNOWLEDGE ON THE PART OF FACULTY COULD MAKE SUCH RESEARCH FAR MORE USEFUL THAN IT OFTEN IS.

ANOTHER EXAMPLE OF RESEARCH THAT IS OUT OF THE MAINSTREAM OF INDUSTRIAL USEFULNESS IS THE \$2 MILLION A YEAR THAT THE BUREAU OF STANDARDS SPENDS ON OSTENSIBLY RELEVANT RESEARCH. IT IS CONDUCTING RESEARCH AND DEVELOPMENT WITHOUT USING THE ADVICE IT SOUGHT FROM PRODUCERS AND STEEL USERS. IGNORING SUGGESTIONS FROM THOSE TWO GROUPS ABOUT HOW TO FOCUS STEEL RESEARCH MAKES 99 PERCENT OF THE RESEARCH DONE BY THE BUREAU OF STANDARDS IRRELEVANT TO MARKET NEEDS, IN THE OPINION OF INDUSTRY EXPERTS WHO HAVE REVIEWED THEIR WORK.

AT NORTH STAR STEEL WE SUPPORT RESEARCH THAT CAN BE APPLIED TO OUR BUSINESS BOTH TODAY AND IN THE FUTURE. OUR LEAN-AND-MEAN PHILOSOPHY, HOWEVER, MAKES US BELIEVE RESEARCH AND DEVELOPMENT WITH CLEAR, THEORETICALLY ATTAINABLE AND COMMERCIALY USEFUL GOALS IS IMPORTANT.

KNOWLEDGE BY RESEARCHERS OF THE LIMITATIONS OF RAW MATERIALS, ECONOMIC EFFECTS OF PROCESSING VARIABLES AND POTENTIAL PROBLEMS OF SCALING-UP PRODUCTION IS ABSOLUTELY ESSENTIAL IF THE RESEARCH IS TO BE USEFUL. THIS YEAR WE'LL SPEND \$1-MILLION DOLLARS ON DEVELOPMENT WORK THAT WE BELIEVE WILL RESULT IN NEW PROCESSES TO MEET THE NEEDS OF CUSTOMERS. WE ARE COMMITTED TO MEETING CUSTOMERS' NEEDS, INCLUDING LOWER-COST MATERIALS, THE GOAL OF RESEARCH.

THE CHALLENGE IS TO IDENTIFY WHAT NEEDS ARE TO BE MET, TO SET THE REQUIREMENTS AND THEN FIND SOLUTIONS. THAT'S RESEARCH. WHAT'S MOST IMPORTANT ABOUT THE QUALITY OF RESEARCH IS THE ATTITUDES OF THE PEOPLE WHO DO IT AND THE DIRECTION IN WHICH IT IS AIMED.

TO QUOTE THE CONFERENCE BOARD STUDY AGAIN, "ANOTHER CHANGE INVOLVES A RECOGNITION THAT THE LINE BETWEEN BASIC AND APPLIED RESEARCH IS BLURRING AND THAT GREATER INTERACTION IS NEEDED BETWEEN BASIC RESEARCH AND TECHNOLOGY DEVELOPMENT.

"WE HAVE COME TO REALIZE THAT THE INNOVATION PROCESS IS NOT SEQUENTIAL. THAT IS, PURE SCIENCE LEADING TO TECHNOLOGY AND THEN TO ECONOMIC OPPORTUNITY. IT INVOLVES STRONG COUPLING-- BOTH WAYS--BETWEEN TECHNOLOGY AND BASIC SCIENCE. EACH IS STIMULATED BY, AND DEPENDENT ON, THE OTHER." SO IF WE IN THE U.S. HAVE THESE PROBLEMS, WHAT IS THE COMPETITION DOING?

HISTORICALLY, THE BRITISH IRON & STEEL RESEARCH ASSOCIATION (BISRA) HELPED MAKE THE UNITED KINGDOM A LEADER IN STEEL PRODUCTION DURING THE 1950S AND 1960S. THAT ASSOCIATION OPERATED A VERY ACTIVE PILOT-PLANT LABORATORY THAT WAS FUNDED BY CHECK-OFF TYPE SUPPORT FROM INDIVIDUAL COMPANIES. THEY CONTRIBUTED A SET AMOUNT FOR EACH TON OF STEEL SOLD.

BISRA WAS DISCONTINUED IN THE EARLY 1970S WHEN BRITISH STEEL PRODUCERS WENT THROUGH A RESTRUCTURING AND COST-CUTTING PROCESS SIMILAR TO THE U.S. INDUSTRY'S RECENT EXPERIENCE. AT THAT TIME, BRITISH STEEL CAPACITY EXCEEDED U.K. DEMAND BY 50 PERCENT AND LABOR-UNION-DRIVEN EMPLOYMENT PRACTICES HAD MADE IT UNCOMPETITIVE, BUT ITS MECHANISM FOR FOCUSING RESEARCH WAS SUCCESSFUL. WHILE BISRA EXISTED, IT HAD TREMENDOUS INFLUENCE ON ADVANCEMENTS IN STEEL TECHNOLOGY.

EXAMPLES OF OTHER COMPETITOR NATIONS WITH PRACTICALLY-FOCUSED, GOVERNMENT-FUNDED LABORATORY RESEARCH FOR STEEL INCLUDE FRANCE'S IRSID ORGANIZATION; BELGIUM'S CRM; WEST GERMANY'S GERMAN PROFESSIONAL METALLURGY SOCIETY (VDEH), WHICH DOES A MIXTURE OF CONTRACT AND GOVERNMENT-FUNDED RESEARCH, AS WELL AS THE MAX PLANCK INSTITUTES AT SEVERAL GERMAN FEDERAL UNIVERSITIES THAT DO A COMBINATION OF FUNDAMENTAL AND DEVELOPMENTAL RESEARCH IN CLOSE CONJUNCTION WITH INDUSTRY.

ADDITIONAL CENTRALLY COORDINATED RESEARCH IS DONE BY ITALY'S CSM GOVERNMENT LABORATORY; SWEDEN'S MEPOS, WHICH DOES BASE-LEVEL, GOVERNMENT-FUNDED RESEARCH AND ALSO CONTRACTS RESEARCH FOR INDUSTRY; BRAZIL'S GOVERNMENT-FUNDED ABM RESEARCH CENTER; INDIA'S GOVERNMENT R&D FACILITY; AND CHINA'S BEIJING UNIVERSITY FOR IRON AND STEEL TECHNOLOGY. OF COURSE, THE SOVIET UNION AND MOST EASTERN EUROPEAN COUNTRIES HAVE SIGNIFICANT STATE-SUPPORTED METALLURGICAL RESEARCH INSTITUTES WITH HEAVY EMPHASIS ON METAL PROCESSING.

THE JAPANESE HAVE ESTABLISHED MAJOR PILOT FACILITIES AT A NUMBER OF UNIVERSITIES. THOSE FACILITIES ARE STAFFED BY INDUSTRIAL RESEARCH ENGINEERS ON LOAN TO THE FACILITY. ALL THE MAJOR JAPANESE COMPANIES ALSO ARE MEMBERS OF A NUMBER OF CONSORTIA FOCUSED ON MAJOR MATERIALS TECHNOLOGY, THE MOST RECENT INVOLVING REO-CASTING. THAT CONSORTIUM INCLUDES, INCIDENTALLY, A MAJOR JAPANESE BANK.

MY POINT IS THAT MOST OF OUR COMPETITORS ARE DOING COORDINATED, PRACTICALLY-FOCUSED, GOVERNMENT-SUPPORTED STEEL RESEARCH--WE AREN'T.

FAILING TO HAVE A CENTRALLY LOCATED RESEARCH AND DEVELOPMENT ORGANIZATION AND FACILITY FOR STEEL AND METAL-WORKING TECHNOLOGY-DEVELOPMENT PUTS THE UNITED STATES PERMANENTLY BEHIND COMPETITORS. THOSE WHOSE ATTITUDE IS "WE'LL ADOPT THE BEST NEW, PROVEN TECHNOLOGY" ARE CONSIGNING U.S. INDUSTRY TO REMAINING 5 YEARS OR MORE BEHIND THE LEADING EDGE OF TECHNOLOGY AND ITS APPLICATIONS.

THEREFORE, IT'S MY BELIEF THAT WE NEED TO CREATE A STEEL DEVELOPMENT CENTER IN THE UNITED STATES. IT COULD BE DONE AT NO INCREMENTAL COST TO THE U.S. GOVERNMENT BY REDIRECTING A PORTION OF MONEY NOW SPENT AT SEVERAL U.S. BUREAU OF MINES RESEARCH STATIONS, SOME OF THE MONEY SPENT BY THE DOD; MONEY SPENT BY DOE AT VARIOUS LOCATIONS AND IN THE STEEL INITIATIVE, SOME MONEY SPENT BY NBS AND NSF, AS WELL AS BY NASA AND THE DEPARTMENT OF TRANSPORTATION. THOSE FUNDS, WHICH BATTELLE ESTIMATES COULD TOTAL \$219 MILLION, COULD PROVIDE AS MUCH AS \$100 MILLION OPERATING SUBSIDY FOR THE CENTER. INDUSTRY ALSO COULD CONTRIBUTE FUNDING, PERHAPS THROUGH CONTRACT RESEARCH OR A CHECK-OFF FOR EACH TON SOLD.

SUCH A CENTER SHOULD BE OPERATED BY AN INDEPENDENT BOARD OF DIRECTORS WITH ADMINISTRATION BY A CONTRACTOR, WITH EXPERIENCE AT RUNNING MULTI-CLIENT PROJECTS WITH COMMERCIAL GOALS. THE MAJORITY OF THE BOARD OF DIRECTORS OF THE CENTER SHOULD COME FROM STEEL-CONSUMING INDUSTRIES AND STEEL-PRODUCING COMPANIES BOTH OF WHICH SHOULD BE REPRESENTED. DIRECTION SHOULD NOT BE BY ANY GOVERNMENT AGENCY OR ANY UNIVERSITY, ALTHOUGH REPRESENTATIVES OF THESE SECTORS MIGHT ALSO SERVE ON THE BOARD OF DIRECTORS. DIRECTION AND CHOICE OF PROJECTS WOULD BE BASED ON MUTUALLY AGREED UPON AND WELL-DEFINED GOALS AND COULD INCLUDE BASIC RESEARCH IF IT WOULD SUPPORT THE ULTIMATE COMMERCIAL GOALS.

THE EQUIPMENT FOR SUCH A CENTER, AND SITES, ARE AVAILABLE AT VARIOUS LOCATIONS THROUGHOUT THE COUNTRY. THE CURRENT PROBLEM IS THAT THE EQUIPMENT IS SCATTERED AND UNDER-UTILIZED. MOST OF THE EQUIPMENT IS OWNED BY EXISTING GOVERNMENT AGENCIES OR UNIVERSITIES, NONE OF WHICH ARE THOROUGHLY INTEGRATED TO CARRY OUT MEANINGFUL NEW PRODUCT OR PROCESS SCALE-UP WORK. THE EQUIPMENT NEEDS TO BE CENTRALIZED SO MELTING, REFINING, CASTING, ROLLING, FORGING, COATING AND OTHER WORK CAN BE DONE SO THAT PROPERTIES AND ECONOMICS OF NEW PROCESSES AND PRODUCTS CAN BE EVALUATED ON FULL OR PILOT SCALE. U.S. STEEL AT MONROEVILLE HAD THAT CAPABILITY, AS DID BETHLEHEM AT HOMER LABS.

THERE IS A GENUINE NEED FOR A GOOD NATIONAL LABORATORY ON STEEL AND METAL PROCESSING. SUCH A FACILITY COULD BE FINANCED WITH ALREADY EXISTING FUNDS, IT COULD BE ASSEMBLED AT LITTLE EXTRA COST AND OPERATED AT NO EXTRA COST. BUT, IT REQUIRES MAKING HARD DECISIONS ABOUT HOW SERIOUS WE ARE ABOUT MAKING THE U.S. STEEL AND METALWORKING INDUSTRY MORE TRULY COMPETITIVE. IT ALSO WILL REQUIRE DECISIONS TO DISCONTINUE UNNEEDED RESEARCH CURRENTLY BEING DONE AND TO REALLOCATE FUNDS FOR THAT PURPOSE.

I BELIEVE S-2470 BEGINS TO ADDRESS THESE PROBLEMS. IT DIRECTS COORDINATION BETWEEN THE BUREAU OF STANDARDS AND DEPARTMENT OF ENERGY STEEL RESEARCH. IT ADDRESSES THE NEEDS FOR PROPRIETARY RIGHTS FLOWING TO THOSE WHO NEED AN INCENTIVE TO COMMERCIALIZE THE RESULTS. UNFORTUNATELY, IT STILL LEAVES IN PLACE MANAGEMENT BY THE GOVERNMENT; IT DOES NOT ADDRESS THE ISSUE OF INVOLVEMENT BY STEEL-CONSUMING INDUSTRIES, AND IGNORES THE EFFICIENT USE OF PILOT-PLANT CAPITAL EQUIPMENT. IT ALSO IS TOO SPECIFIC IN DEFINING PRIORITIES. I DO NOT BELIEVE THAT LEVEL OF SPECIFICITY BELONGS IN LEGISLATION.

THE FEDERAL GOVERNMENT'S ROLE SHOULD BE TO MOBILIZE THE VARIOUS FACTIONS DOING STEEL RESEARCH INTO A COHESIVE ORGANIZATION DEDICATED TO REKINDLING THE COMPETITIVENESS OF U.S. STEELMAKERS AND THEIR CUSTOMERS. ESTABLISHING A NATIONAL STEEL DEVELOPMENT CENTER WITH PILOT-PLANT CAPABILITIES WOULD GREATLY AID TECHNOLOGY TRANSFER. THE EQUIPMENT AND FACILITIES ALL EXIST SOMEWHERE. SO DOES THE BUDGET, IF PROPER REALLOCATIONS ARE MADE. ANY NEW INITIATIVES IN U.S. STEEL RESEARCH SHOULD EMPHASIZE GOALS BASED ON REAL-WORLD NEEDS OF STEEL PRODUCERS AND STEEL USERS. NOT INVOLVING THOSE TWO GROUPS WILL CONSIGN THE UNITED STATES TO REMAINING FAR FROM THE LEADING EDGE OF STEEL RESEARCH AND TECHNOLOGY DEVELOPMENT. THE PRESENT SYSTEM IS A DISASTER. WORSE, IT IS A WASTE. LET'S TRY A BETTER TACK.

0172S

Senator METZENBAUM. Thank you, Mr. Geiger. Tell me, Mr. Geiger, how many mini mills does North Star operate?

Dr. GEIGER. Seven. We're the largest mini mill company at the present time.

Senator METZENBAUM. And how is a mini mill defined, as distinguished from a regular mill? Briefly.

Dr. GEIGER. Philosophy.

Senator METZENBAUM. Philosophy?

Dr. GEIGER. Really it's just a matter of philosophy. You can take—all of our mills are based on scrap. They're all continuously cast. They all have a rolling mill. There are other people that don't consider themselves mini mills who have exactly the same product line. It's a matter of the organizational structure and the attention to what you're doing and the focus on things. It's just a philosophical approach.

Senator METZENBAUM. Are some of the mini mills organized and some unorganized?

Dr. GEIGER. Yes.

Senator METZENBAUM. Some are organized?

Dr. GEIGER. In terms of the labor?

Senator METZENBAUM. Labor.

Dr. GEIGER. Yes. Five out of our seven mills have contracts with the steelworker union.

Senator METZENBAUM. I see. Mr. Attwood, how would you—or Dr. Attwood, how would you say your facility compares with those of the Japanese and the European steelmakers?

Dr. ATTWOOD. From a facility standpoint, I think we compare quite favorably. The emphasis—This facility, of course, was built in the mid '50s and certainly there were times when there was a much bigger investment in research in the steel industry at that time than there is today.

I would characterize the major difference between ourselves and the Japanese in terms of their pilot facilities. They are very fond of building very large pilot facilities which allow them to both simulate existing processes and to develop new processes. This is a very expensive step. We are doing a limited amount of this kind of research now in the area of stripcasting, but we will be faced with a major expenditure in that area and a decision will have to be made as to whether we can proceed along the same lines as the Japanese would.

The Europeans have larger facilities and I see that there may be a bigger emphasis on customer technologies, stamping presses, equipment that you might normally find in an automobile plant.

Again, we are looking very hard at expanding our capabilities in that area so that we can offer more technical support to our customers.

Senator METZENBAUM. Let me just ask you, Mr. Pendleton. Thank you, Dr. Attwood. We almost lost the specialty steel industry in this country and its recovery is almost an all-American success story.

You cite the specialty steel industry's commitment to R&D as a major component in that turnaround. Would the same formula, in your opinion, similarly benefit the carbon steel industry?

Mr. PENDLETON. I think R & D in both process and products is critical to any metal-type industry. We have tried to maintain that through the years and certainly it's very very important. We have been a little disturbed about what has happened in the carbon steel area as a matter of survival in cost reduction. We have some very good R & D operations being reduced and cut.

By and large, the specialty industry has had the fortune of being, because of our technology, being more competitive and more profitable and we have been able to maintain R & D. I think carbon steel needs to maintain that R & D as well. So we would hope so in that we would perhaps serve as a model that shows the importance of that.

Senator METZENBAUM. Thank you. We may have some additional questions that we'll submit to you in writing, but I am very grateful to you for your being here this morning. Thank you very much. Let me hear our next two witnesses.

Mr. Mark Barbash, Deputy Director, Business Development Division of the Ohio Department of Development, accompanied by Miss Deborah Tegtmeyer; and Dr. George R. St. Pierre, Professor and Chairman, Department of Metallurgical Engineering, the Ohio State University.

Mr. Barbash, you may proceed, please.

STATEMENT OF MARK BARBASH, DEPUTY DIRECTOR, OHIO DEPARTMENT OF DEVELOPMENT DIVISIONS OF BUSINESS DEVELOPMENT AND ECONOMIC DEVELOPMENT FINANCING, ACCOMPANIED BY DEBORAH TEGTMEYER

Mr. BARBASH. Senator Metzenbaum, we appreciate the opportunity to be here. It's entirely appropriate that you put us directly across from the clock so that we can keep a watch on it.

Let me focus very briefly our remarks on what the state of Ohio has been doing with regards to the establishment of a program that we call the Ohio Steel Futures Program. Primarily, to hopefully add to the support for your legislation and to add to the concept that there is a strong opportunity via the use of partnerships to further develop the research and development capacity in the United States, the Governor proposed a couple of years ago, and the General Assembly approved, the establishment of an Ohio Steel Futures Program.

The initiative was introduced in the legislature by Representative Mike Verich and Senator Barry Levey. What we attempted to do was to discuss with the unions, with some of the companies around the state and with the education and training institutions to assess the proper role of a state government in development of the steel industry in the United States, and in particular in Ohio.

The focus, quite obviously, and I think your legislation hits on it, is that everyone down the line concluded that additional capacity in research and development was absolutely critical. One of the things that we found was that there was a real interest in again trying to develop the partnership so that, in fact, the opportunity for R&D can be leveraged.

I would like to note that four of Ohio's Thomas Edison Centers are helping to work on research and development in the steel in-

dustry. The Edison Welding Institute in Columbus, the Advanced Manufacturing Centers in Cleveland and Cincinnati, the Edison Industrial System Center that is being established in Toledo, we hope will be a model for you in the sense that while they are young, they have shown that cooperation between government and educational institutions and business can, in fact, work, and that we can leverage our resources substantially.

I will not talk much about R&D, because you've heard some people who are far better experts than I am.

Let me add there other areas that are beyond research and development that our Steel Futures Program is going to focus on in a limited way. One of those is going to be plant acquisition feasibility studies. You're aware that LTV has decided to sell the Warren Works. One of the things that we did in conjunction with the steelworkers, and I want to, by the way, say that it's a pleasure to follow Frank Valenta, because he's a real example of the kind of person who sees an opportunity and goes after it and still represents his workers, and I think that's very important.

Senator METZENBAUM. Don't compliment him too much.

Mr. BARBASH. I won't. That's enough. It's only one line in the statement, Frank.

Mr. VALENTA. Get it in the record.

Mr. BARBASH. Thank you. We worked with the steelworkers to try to access the validity of an acquisition of that plant by either an ease out or a leverage buyout. One of the challenges in the steel industry is that as companies like LTV divest themselves of smaller facilities, that may be profitable and may fit into someone else's scheme of business, it's a tough investment decision, and it's particularly so when you're talking smaller facilities, so we think that there's a role for government in that area.

We also think that there's a role for government in the area of job training. And all you need to understand is that when you have state-of-the-art technology and state-of-the-art equipment, we need to have state-of-the-art workers who need to understand where the technology is going and be prepared as they change.

We also think, lastly, that there's a role for government in the area of labor-management cooperation. The State of Ohio has a program, the labor-management centers, labor-management committees, we have a state-wide tripartite commission that tries to work at it, and again in the sense of—Yes, one minute.

We think that it's important that this all be done as a partnership. We are presently looking at \$16 million in requests. The State of Ohio will have, maybe at the most, two and a half million dollars per year to spend. We stand ready to be supportive and to be a partner with this legislation and look forward to it. Thank you.

[The prepared statement of Mr. Barbash follows:]

STATEMENT BY

MARK BARBASH, DEPUTY DIRECTOR
OHIO DEPARTMENT OF DEVELOPMENT
DIVISIONS OF BUSINESS DEVELOPMENT &
ECONOMIC DEVELOPMENT FINANCING

U.S. SENATE BEFORE THE ENERGY SUBCOMMITTEE ON
ENERGY REGULATION AND CONSERVATION.

S.2470: STEEL TECHNOLOGY COMPETITIVENESS AND ENERGY CONSERVATION ACT OF 1988.

FRIDAY, JULY 1, 1988

PREPARED WITH THE ASSISTANCE OF DEBORAH TEGMEYER
BUSINESS DEVELOPMENT DIVISION/DOD

I am Mark Barbash. I serve as Deputy Director of the Ohio Department of Development Divisions of Business Development and Economic Development Financing.

I am pleased to appear in support of S.2470, the "Steel Technology Competitiveness and Energy Conservation Act of 1988."

The two divisions are primarily responsible for the State of Ohio's international and domestic business attraction and retention programs.

This legislation, introduced by Senator Metzenbaum and Senator Heinz of Pennsylvania, is of importance because it focuses upon our need and our ability to take advantage of long-range opportunities to stimulate the competitiveness of the steel industry in Ohio and in the United States.

We are pleased, as well, to support this legislation, as it reflects a priority of Governor Richard Celeste to take some important steps at both the state and federal levels towards targeting our resources to specific industries where we can have a measurable impact. For the record, attached to this statement is a brief summary of recent State of Ohio investment in the steel industry, ranging from research and development to financing for both equipment expansions and company buyouts.

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A whole series of events has occurred to make this a unique time to take strong positive steps to insure the long-term competitiveness of the domestic steel industry.

We are all familiar with the negative events in the steel industry. Let me cite, therefore, just a few of the positive activities which point the way towards what can be a strong public-private partnership:

- o U.S. steel makers have announced in recent months massive investments in equipment.

- o There are several situations where labor-management relations in certain parts of the steel industry have significantly improved.

- o Certainly the American steel industry has felt the effects of the changing yen-dollar relationship.

- o In Ohio and elsewhere, several recent spin-offs or sales of so-called distressed companies have been successful in revitalizing their activities. Included among these are Mercury Stainless in Massillon, Bliss-Salem in Salem, Ohio, North Star Steel in Youngstown, and American Steel and Wire in Cuyahoga Heights.

In Ohio, the steel industry still employs more than 65,000 citizens, with thousands more in the ranks of retired steel workers. This means that the steel industry must remain a high priority for public/private partnership efforts.

In 1987, Governor Celeste proposed the establishment of the Ohio Steel Futures Program. This past March, the Ohio Legislature passed a supportive bill establishing the Ohio Steel Futures Fund.

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Administered by the Ohio Department of Development, this fund is designed to provide financial and technical assistance to increase the competitiveness of Ohio's existing steel and steel related industries.

In response to these initiatives, over the past year, we have been meeting with and surveying a wide range of steel related businesses, educational institutions, and labor unions to ask them what the needs of the steel industry are in the State of Ohio. For our contribution to the record, I would like to briefly report on the results of our work, as I hope it will contribute to the case you have been making about the need to work with the industry in a broad range of areas.

Our survey illustrates why this legislation is such a critical part of a federal strategy for steel industry revitalization.

We identified four priorities which the Department of Development believes are important.

First and foremost among the priorities is Technology Development.

The technology needs of the steel industry are, to a great extent, being driven by their customers and by international competition. As the auto industry demanded a more rust-resistant car, electrogalvanizing became a must to stay competitive. And with the pressures for cost cutting and international competitiveness being so strong, it is critical that the industry stay on the cutting edge of steel making and processing technology development. This might range from improving the continuous casting process to refining the basic steel process by taking molten steel directly to strip steel.

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Four of Ohio's Thomas Edison Centers are helping to serve the research and development needs of the steel and related metals industries. The Edison Welding Institute of Columbus, the Centers for Advanced Manufacturing in Cleveland and Cincinnati, and the soon-to-be-established Edison Industrial Systems Center in Toledo are helping to lay the groundwork for future developments in the steel manufacturing and related industries.

The experience of the Edison program in Ohio is that cooperation among the steel industry, educational institutions and government in R & D can work, if the focus is on research which will contribute to the advancement of the industry as a whole.

This need for technology development also needs to be directed at both ends of the spectrum: steel production and waste treatment.

Though the "Ohio Steel Futures Program" funds will be used for a variety of purposes, our discussions with steel industry executives and those who study the industry have repeatedly emphasized the need to concentrate on research and development activities.

The purchase of technologies is necessary, and can provide a jump on competition in the short term.

But until we as a nation can again lead in the development of technologies, methods of steel production, and do it in conjunction with minimizing the use of our nation's energy resources, we will continue to be vulnerable to the whims of the world economy.

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Three other areas will be addressed by the Ohio Steel Futures Program:

Plant Acquisition Feasibility Studies The number of integrated steel mills are dwindling. While there remains a need for such facilities, over the past several years many larger mill operators have been selling off parts of their operations and concentrating on only one part of the steel industry.

Some of these sales are of money-losing operations, which cannot be salvaged.

Others are of divisions which are being sold so that a company can return to its core business or which can generate needed income for the company.

Such is the case with the LTV sale of its Warren facility, which in the past two years, has been highly profitable and productive.

In some of these circumstances, there is a need for assistance in evaluating the feasibility of such facilities for purchase, through Employee Stock Ownership Plans, management buyouts or acquisition by other companies for continued operations. While normally we would not suggest that government get involved so deeply involved in a private sector investment process, the challenge with steel facilities requires an extra effort.

Worker Training: The nation's competitiveness depends upon the development of technology, but it is the skill of the workers that determines a project's success. As technology is introduced and as companies change hands, worker training and retraining must keep pace with the introduction of state-of-the-art equipment.

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Labor-Management Relations: It is clear that a progressive approach to labor-management relations is as important as technology and worker training. This has been demonstrated most recently by the LTV-Sumitomo electro-galvanizing joint venture in Cleveland, where the productivity has exceeded that of its sister facility in Japan.

In a similar accomplishment, the joint venture between Armco and C.Itoh in Tipp City, Ohio has served to demonstrate that cooperation between management and labor can result in a strong bottom line.

Both facilities are governed by precedent-setting labor management agreements which reduce the number of job classifications and provide for significant input on the part of the worker in day to day operations. Problems are solved on the plant floor, not in the offices.

Both the companies---LTV and Armco---and the United Steel Workers, and in particular District Director Frank Valenta, are to be congratulated for their work on these projects.

Those are the four areas which the State of Ohio has identified as areas for concentrated work in the steel industry.

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The State of Ohio's "Steel Futures Fund" appropriation is limited to only \$5 million over this biennium. Already, we have committed nearly \$1.3 million, and we are currently reviewing requests totaling more than \$16 million. Our limited state monies will only be useful if they can leverage larger sources of funds. And the \$16 million represents only a handful of projects proposed by a few Ohio institutions. Needless to say, such limited state resources cannot begin to meet the needs outlined for us by those in the industry.

We must and will exercise prudent fiscal responsibility, in conjunction with the promotion of cooperative industry/academic efforts, when awarding Steel Futures Funds. But, we are concerned about our ability to meet the immediate needs of the steel industry as it attempts to keep up with fast-paced technological change.

Senate Bill 2470 can assist both our efforts and the steel industry's endeavors by providing a significant source of funds targeted specifically to research and development needs.

We are excited about the Senator's proposed bill and we are excited about the possibilities it represents for Ohio's steel industry to increase its competitiveness in world markets. We are excited about finding ways to improve our technological efficiency while using our precious energy resources wisely.

Thank you for this opportunity to speak before you today.

Economic Development Financing
 Direct Loans to Steel and Steel-Related Enterprises
 June, 1988

The Ohio Department of Development has awarded the following Direct Loans to steel and steel-related firms in Ohio: *

Company	County	State Loan Amount	DFAB Approval
Copperweld	Trumbull	\$2,000,000	1/8/87
E.W. Bliss	Columbiana	\$810,000	10/9/86
Tri State Fabricators	Hamilton	\$150,000	6/12/86
American Steel & Wire	Cuyahoga	\$4,000,000	3/13/86
H & H Steel Proc.	Butler	\$875,000	6/13/85
Dietrich Inds.	Trumbull	\$1,000,000	1/31/84
Niles Expanded Metals	Trumbull	\$400,000	8/15/85
Ferrous Metal Products	Cuyahoga	\$500,000	3/24/87
Hunt Valve Co.	Columbiana	\$300,000	5/14/87
Davidson Metals, Inc.	Mahoning	\$225,000	11/12/87
Cast-Fab Technologies	Hamilton	\$1,000,000	11/12/87
Metal Carbides Inc.	Mahoning	\$632,500	4/14/88
G & C Foundry Co.	Erie	\$276,000	4/14/88
Enduro Stainless	Stark	<u>\$3,000,000</u>	7/10/86
	TOTAL	15,168,500	

* This is a partial listing.

Industrial Inducement Account
Awards to Steel and Steel-Related Enterprises
June, 1988

The Ohio Department of Development has awarded the following grants to steel and steel-related firms in Ohio: *

Armco	\$ 250,000	(9/24/84)
Armco	2,500,000	(10/21/85)
Armco Tipp City	150,000	(10/21/85)
LTV	2,500,000	(10/21/85)
Amer. Steel & Wire	1,500,000	(6/20/86)
North Star Steel	750,000	(6/3/85)
Irononton Iron	155,000	(6/3/85)
Irononton Iron	530,000	(11/23/87)
Mercury Stainless	100,000	(12/21/87)
Gibraltar Steel	300,000	(6/6/88)
Murayama Iron Works	<u>45,000</u>	(6/20/88)
Total	\$8,780,000	

Others:

Wells Aluminum	\$ 50,000	(10/21/85)
Mansfield Ferrous Metals	55,000	(10/21/85)
Intermetro Industries	40,000	(2/3/87)
Showa Aluminum Corp.	75,000	(2/9/87)
Cleveland Track Materials	75,000	(10/24/86)
Bell Service Systems	200,000	(3/23/87)
Bliss-Salem	130,000	(11/9/87)
United Steelworkers	57,650	(4/25/88)
American Carbon Ind.	<u>25,000</u>	(6/6/88)
Total	\$707,650	

* This is a partial list.

OHIO'S THOMAS EDISON PROGRAM SEED DEVELOPMENT FUND	EDISON CONTRIBUTION	TOTAL COST
TOTAL EDISON STEEL RESEARCH ACTIVITY	\$ 562,040	\$1,219,646
<u>Steel Production Research</u>	\$ 62,906	\$ 161,821
The Timken Co./Univ. of Cincinnati Development and demonstration of robotic handling system for loading baskets that charge pit carburizing furnaces, while also assisting in quenching and heat treatment processes.	\$ 30,440	\$ 68,155
Armco, Inc./Univ. of Cincinnati Study feasibility of an improved electrogalvanizing process through modification of electrolyte flowrate, allowing increased production while maintaining quality.	\$ 32,466	\$ 93,666
<u>Steel Processing Research</u>	\$ 149,439	\$ 315,296
General Electric/Miami University Production of a high efficiency laser generated by thermal processes, with potential laser processing applications in cutting, welding, alloying and treatment of metals.	\$ 50,000	\$ 114,257
Die Cast Dies/Case Western Reserve Univ. Conversion of process for inhibiting oxidation in steel used to produce the die to actual dies in machines, reducing thermal fatigue and fracture of dies.	\$ 49,439	\$ 101,039
Ribbon Technology Corp./Ohio State Univ. Demonstrate feasibility of casting filler materials for joining processes (brazing, welding, or soldering) through rapid solidification.	\$ 50,000	\$ 100,000

<u>Steel-related Applications</u>	\$ 349,695	\$ 742,529
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Dayton Tinker Corp./Univ. of Dayton	\$ 49,999	\$ 99,998
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Production of anticorrosive films, using film properties and compositions of amorphous nickel, for the protection of components used in corrosive environments (i.e. ball bearings).

Rimrock Corp./Ohio State Univ.	\$ 49,996	\$ 105,631
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Modification of materials handling robot to extend capabilities to a greater variety of tasks in die-casting and machine loading and unloading applications.

Cyclops Corp./Empire Detroit Steel Division/North Central Technical College	\$ 249,700	\$ 536,900
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Industrial Sound Abatement barriers.

28-Jun-88

OITP 1988

STEEL FUTURES FUND SET-ASIDE

\$1,250,000.00

Company	County	Amount
Teledyne/Ohio Steel #2	Allen	\$15,040.58
AAP/St. Mary's	Auglaize	197,748.99
Wheeling Pitt.-Martins Ferry #2	Belmont	6,402.48
Wheeling Pitt.-Yorkville	Belmont	5,592.38
Burns Cold Forge	Carroll	4,423.85
Clow	Coshocton	2,817.05
Timken Steel-Bucyrus	Crawford	12,335.28
American Steel & Wire	Cuyahoga	118,714.50
Nanda Corp.	Franklin	1,431.44
Timken-Columbus	Franklin	4,895.59
Metal Forge #2	Henry	52,918.75
Brunswick Steel	Huron	2,997.30
Wheeling Pitt.-Steubenville #4	Jefferson	86,740.00
Ironton Iron #2/FY 88	Lawrence	36,289.00
Stanadyne/Western Steel #2	Lorain	2,738.77
USX-Lorain #3	Lorain	138,197.42
Davidson Metals	Mahoning	13,538.32
North Star Steel #2/FY 88	Mahoning	53,263.20
Marion Steel #3	Marion	26,069.30
Nova Steel/FY 88	Miami	32,535.64
Armco-Zanesville	Muskingum	31,776.44
Empire Detroit Steel #3	Richland	20,276.58
Osco #2	Scioto	30,640.96
Mercury Stainless/FY 88	Stark	61,980.00
T & W Forge, Inc.	Stark	29,275.65
Timken Steel-Canton #2	Stark	141,827.00
Kovatch Castings	Summit	4,508.55
Brainard Strapping/Sharon Steel	Trumbull	6,479.22
Copperweld Steel	Trumbull	53,962.50
Thomas Strip Steel	Trumbull	17,175.25
Vanex Tube	Trumbull	3,992.28
Wayne Steel	Wayne	5,840.99
		=====
BALANCE COMMITTED:		\$1,222,425.26
REMAINING BALANCE:		\$27,574.74
RETURNED TO GENERAL POOL		

Senator METZENBAUM. Thank you very much, Mr. Barbash. And it is very nice to have you with us, Ms. Tegtmeier.

Dr. George R. St. Pierre will be our last witness, Professor and Chairman of the Department of Metallurgical Engineering at the Ohio State University.

STATEMENT OF DR. GEORGE R. ST. PIERRE, PRESIDENTIAL PROFESSOR AND CHAIRMAN, DEPARTMENT OF METALLURGICAL ENGINEERING, OHIO STATE UNIVERSITY

Dr. ST. PIERRE. Good afternoon, Senator. It is a pleasure to have the opportunity to speak before this Committee and register my support and that of my colleagues for Senate Bill S. 2470.

I have just returned from a special joint American and German Workshop on Innovative Iron and Steelmaking Processes that was held outside of Duesseldorf from June 18th to the 21st. The participants included eight representatives from U.S. industries and universities and nineteen representatives from Germany.

During the last session of the Workshop, there was a challenging discussion on research needs. Afterwards, the American participants were unanimous in their recognition of the need for research and development on innovative processes to help in the rejuvenation of our steel production capabilities.

As an American who has been associated with the steel industry for more than 37 years, first as a graduate student, then as an employee of a major steel producer, and now as a professor at a leading American university, it is clear that our competitive advantage in steel production declined steadily over the past three decades. Now we have a chance to turn the corner. Our industry is poised to move into a period of improving technical and economic advantage.

This opportunity will be lost if we ignore the needs for research and education on new technologies and energy conservation advances. The American steel industry needs a steady input of fresh ideas and enthusiastic and well-educated young engineers, scientists and administrators who can join the core of experienced men and women in our steel companies.

The proposed S. 2470, the Steel Technology Competitiveness and Energy Conservation Act of 1988, considered by the Subcommittee chaired by Senator Howard M. Metzenbaum addresses all of these issues. It will stimulate education and research on problems critical to the development of technologies for advanced steelmaking and processing and for energy conservation.

In the latter category, these efforts will be directed also to lessening our dependence on imported raw materials and fuels and an expansion of the use of domestic raw materials and energy sources.

By developing strong programs of research and development that combine the talents and facilities of government-industry-university teams, new methods can be found for producing iron from domestic ore and coal sources, for refining iron and domestic scrap into clean steel, and for converting liquid steel, billets, and slabs into high quality products by efficient near net shape and net shape methods.

These efforts will generate new ideas to help the industry maintain an improving international competitiveness. In addition, S.

2470 would enable many new people to be trained for steel related research and for many people currently employed in the steel industry and government laboratories to redirect their efforts.

There are many specific areas of research and development that may be addressed on a broad national front. These have been many studies prepared by experts in the government, industry, and universities which identify targets of opportunity for the proposed R&D. I would be pleased to discuss these with you if time allows.

S. 2470 is a national thrust in that it provides benefits and opportunities for industries and workers throughout the United States.

My colleagues and I thank you for giving us this time to present our views. I would be pleased to provide more technical information for the Subcommittee and to answer any questions. Thank you.

[The prepared statement of Dr. St. Pierre follows:]

Testimony of

DR. GEORGE R. ST. PIERRE
Presidential Professor and Chairman
Department of Metallurgical Engineering
The Ohio State University
Columbus, Ohio 43210

On behalf of

S. 2470, A BILL TO PROMOTE
TECHNOLOGY COMPETITIVENESS AND
ENERGY CONSERVATION IN THE
AMERICAN STEEL INDUSTRY

Before the

ENERGY SUBCOMMITTEE ON ENERGY
REGULATION AND CONSERVATION OF THE
UNITED STATES SENATE

At

LTV CORPORATION, TECHNOLOGY CENTER
6801 Brecksville Road
Independence, Ohio 44131

JULY 1, 1988

Good Morning. I am George St.Pierre, Professor and Chairman of Metallurgical Engineering at The Ohio State University. It is a pleasure to have the opportunity to speak before this Committee and register my support for Senate Bill S. 2470.

I have just returned from a special joint American and German (USA/FRG) Workshop on "Innovative Iron and Steel Making Processes" that was held outside of Duesseldorf from June 18 to 21. The participants included eight representatives from U.S. Industries and Universities and nineteen representatives from Germany. During the last session of the Workshop, there was a challenging discussion on Research Needs. Afterwards, the American participants were unanimous in their recognition of the need for research and development on innovative processes to rejuvenate our steel production capabilities.

As an American who has been associated with the steel industry for more than 37 years, first as a graduate student, then as an employee of a major steel producer, and now as a professor at a leading American University, it is clear that our competitive advantage in steel production declined steadily over the past three decades. Now we have a chance to turn the corner. Our industry is poised to move into a period of improving technical and economic advantage. This opportunity will be lost if we ignore the need for research and education on new technologies and energy conservation advances. The American steel industry needs a steady input of fresh ideas and enthusiastic and well educated young engineers, scientists, and administrators who can join the core of experienced men and women in our steel companies.

The proposed S.2470, The Steel Technology Competitiveness and Energy Conservation Act of 1988 considered by the Subcommittee chaired by Senator Howard M. Metzenbaum addresses all of these issues. It will stimulate education and research on problems critical to the development of technologies for advanced steel making and processing and for energy conservation. In the latter category, these efforts will be directed also at lessening our dependence on imported raw materials and fuels and at expansion of the use of domestic raw materials and energy sources.

By developing strong programs of research and development that combine the talents and facilities of government-industry-university teams, new methods can be found for producing iron from domestic ore and coal sources, for refining iron and domestic scrap into clean steel, and for converting liquid steel, billets, and slabs into high quality products by efficient near net shape methods. These efforts will generate new ideas to help the industry maintain an improving international competitiveness. In addition, S.2470 would enable many new people to be trained for steel related research and for many people currently employed in the steel industry and government laboratories to redirect their efforts.

There are many specific areas of research and development that may be addressed on a broad national front. There have been many studies prepared by experts in the government, industry, and universities which identify targets of opportunity for the proposed research and development. I would be pleased to discuss these with you if time allows.

S.2470 is a national thrust in that it provides benefits and opportunities for industries and workers throughout the U.S.

Thank you for giving me this time to present my views. I would be pleased to provide more technical information for the Subcommittee and to answer any questions.

Senator METZENBAUM. I thank you very much, Dr. St. Pierre. And I thank all of the witnesses.

This has not been a lengthy hearing, but it's very valuable to me, notwithstanding your documents that provide the back-up material that I and my staff need when we go to the floor on an issue. We expect to go to the floor shortly on the issue of providing the funding for this program. We expect to be successful.

I want to say how grateful I am to all of you and to again express my appreciation to LTV for opening their doors. And to quote the words of McArthur to the LTV people, I shall return.

Thank you very much.

[Applause.]

[Whereupon, at 2:15 p.m., the hearing was adjourned.]

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